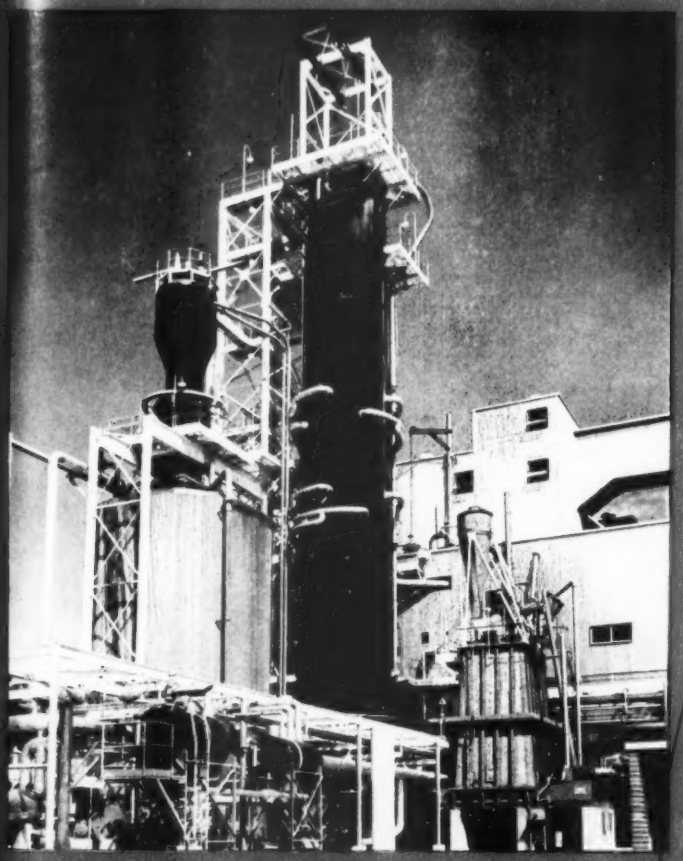
JUNE 1961

THE PAPER INDUSTRY



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TECHNOLOGY DEPARTMENT

Continental Can's new paperboard mill

Pulping around the world

Factors to consider when selecting an unwind stand

Potlatch installs IBM unit on paper machine

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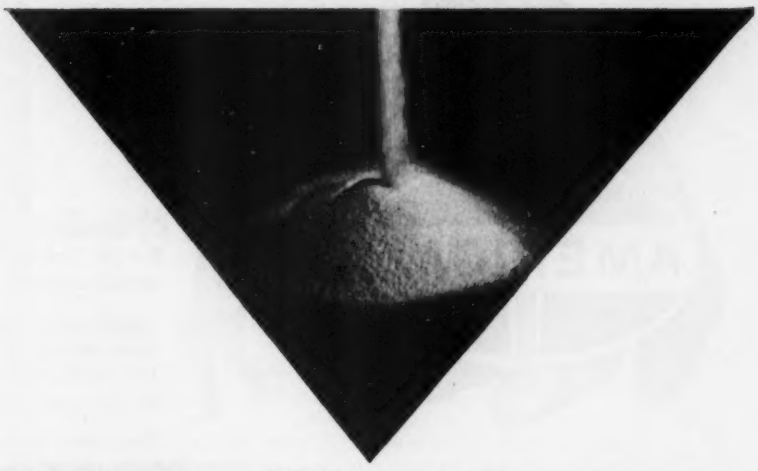

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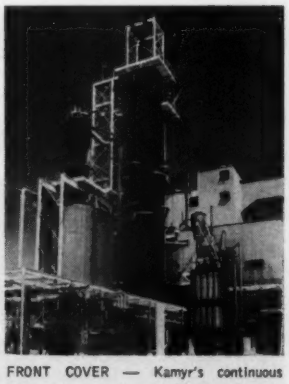

FRONT COVER — Kamyr's continuous digester in operation at Continental Can's August mill. See story on page 155.

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from our point of view

Potlatch Forests makes vital step toward merging plant and office automation

The installation by Potlatch Forests Inc., of an IBM 1710 control system on one of its paper machines marks a major attempt at eliminating the remaining temperamental traits attributed to the paper machine which have been largely responsible for the persistence, in some quarters, of the belief that papermaking still remains largely an art.

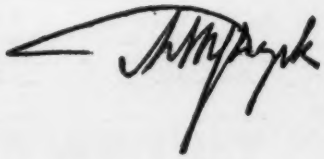
The installation also marks a vital step toward the long coveted merger of plant and office automation, by giving management access to a complete and detailed record of a day's production. This is accomplished by the use of a data converter which translates plant instrument readings into language understood by the computer.

The successful completion of the Potlatch control system will bring the paper-making processes under complete instrument control. For the first time, hundreds of variables will be monitored on the paper machine to bring the needed information to the operator's immediate attention.

Full automation is rapidly becoming a must in the pulp and paper industry, especially where it concerns precision control of new, high-speed, paper-making processes envisaged by many prominent leaders in the industry. Dr. L. R. Thiesmeyer, president of the Canadian Pulp and Paper Research Institute, spoke at the National Symposium of Pulp and Paper Mill Instrumentation of the successful transportation of wood chips through 75-mile-long pipelines and the intriguing possibility of using the pipeline's terminal for cooking the chips prior to their emergence. He also mentioned the feasibility of producing newsprint on refiners rather than on grinders, measuring chemical pulping in terms of seconds rather than hours, and eliminating the wire from the high-speed paper machine. Any of the envisaged innovations can become operationally possible only if put under precision instrument control.

The benefits derived from process instrumentation alone, no matter how highly developed, cannot be complete without merging plant and office automation into a single system. This would eliminate the costly overlapping of the two systems and, of course, provide the obvious advantage of directly feeding market-forecasting and other pertinent economic information from the computer to the automatic control system and vice versa.

Obviously, exhaustive study and planning by a management-appointed task force must precede the adoption of a plant-office automation system. The system must be implemented on a sound technical and economic basis and not come as a result of a rashly conceived and inadequately planned program.



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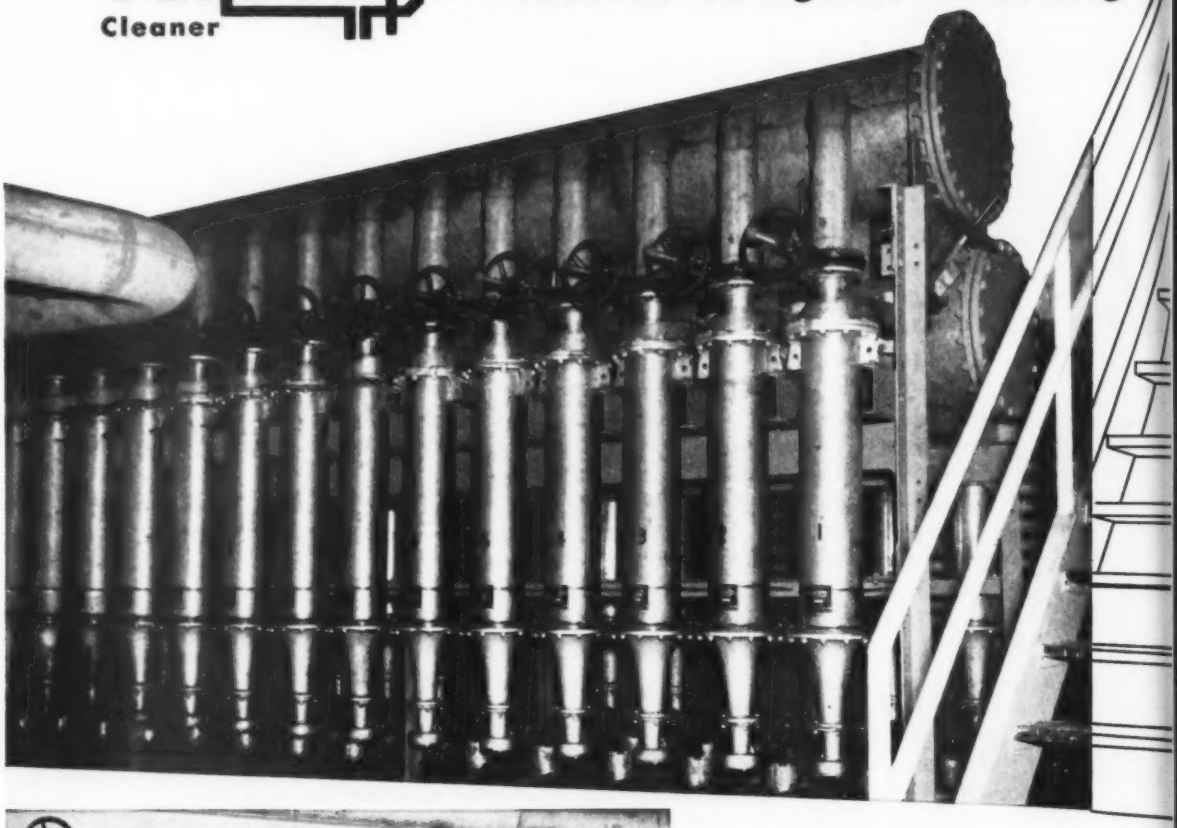

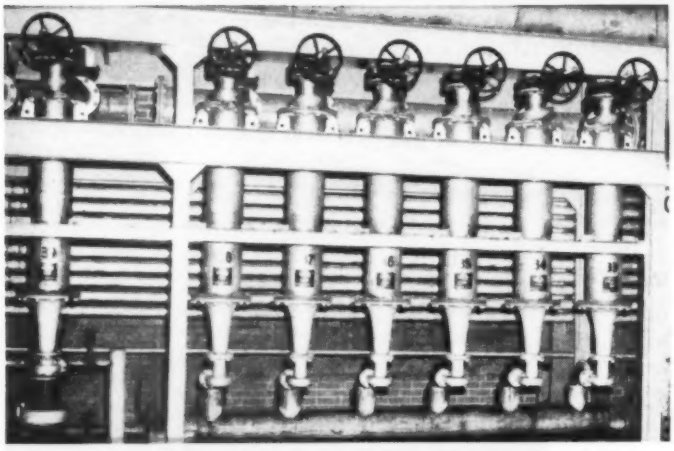

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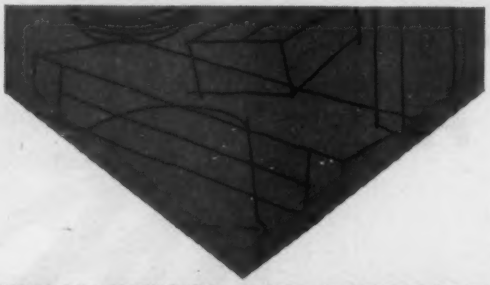

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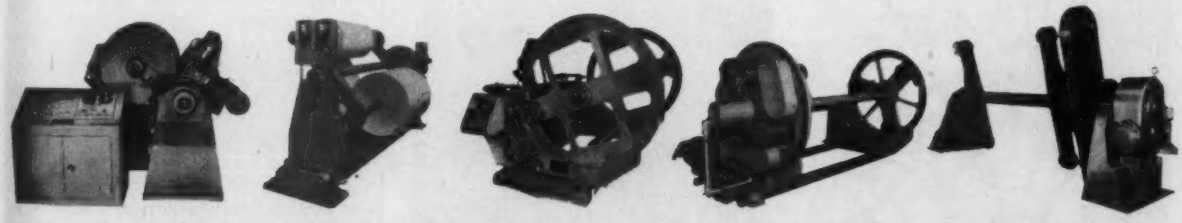

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DICALITE® TECHNICAL REPORT

DICALITE DEPARTMENT • GREAT LAKES CARBON CORPORATION • 612 SO. FLOWER ST., LOS ANGELES 17, CALIFORNIA

New Dicalite BULK-AID TRADEMARK for Paper Products

Dicalite BULK-AID is a new development in inorganic fillers, with particle size range and distribution carefully controlled to give maximum bulking characteristics in paperboard and paper products. BULK-AID has the lowest apparent or bulk density of any known mineral filler for papermaking use, thus providing required caliper at lower weights. One example is that of a 40-point groundwood sheet whose weight was reduced from 29.2 lbs/ft³ to 27.3 lbs/ft³ by the addition of 10% BULK-AID.

The light weight and bulking characteristics of BULK-AID make it especially suitable for use in paperboard; its high brightness and excellent retention are also of considerable value. BULK-AID lowers the furnish cost and increases pulp mileage in top liners for patent white paperboards. Its brightness and opacity raise the quality of underliners at the same time it extends the furnish.

Dicalite BULK-AID is an amorphous mineral, technically an aluminum silicate, produced from a volcanic mineral known as perlite by a special process developed by Great Lakes Carbon Corporation. BULK-AID is inert, insoluble in water, acid or mild alkalies. It is grit-free, and exhibits no reaction with alum in sizing or with other papermaking chemicals. It is readily dispersed in any furnish, does not cause foam, and will not fill felts.

Among BULK-AID's physical characteristics are these:

Color: White

Average G.E. Brightness: 83

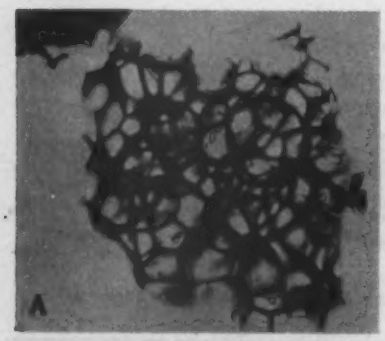
Loose weight: 4½ lbs/ft³ average

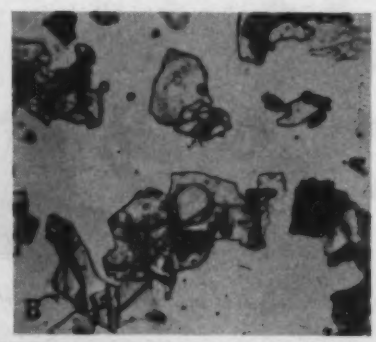
Bulk densities in paperboard: 15 lbs/ft³ average.

Particle size: 80% less than 10 microns

Extensive testing has shown BULK-AID to be successful in actual paper mill production. Most of these tests were on cylinder machines for paperboard production, but limited tests indicate its value in many slow speed fourdrinier applications.

Your Dicalite engineer will be glad to discuss BULK-AID with you and to advise on possible product applications in your own plant.





When perlite is crushed and then suddenly heated to the proper point in its softening range, it pops like corn into particles like that shown in photomicrograph A, containing a myriad of microscopic sealed cells. The size of the original particle and the application of heat are both important, and are critically controlled. This is the expanded material from which BULK-AID is produced. Controlled milling and air classification by an exclusive Great Lakes Carbon Process are the major steps in making BULK-AID, typical particles of which are shown in photomicrograph B.

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Gordon Halvors

DICALITE'S "MAN ON THE SPOT"

The development of Bulk-Aid, to me the industry's need for an extreme low density bulking agent, was ini ated by Gordon Halvorsen, Produ Sales Manager for Dicalite, and he h been closely identified with its te and product application work from th beginning.

Halvorsen has an extensive bac ground in research and developme work, beginning with his graduati from the University of Minnesota wi a degree in Chemical Engineerin Prior to joining Great Lakes Carbo in 1940, Gordon had been engaged technical and laboratory work in t pharmaceutical, corn processing a water treatment fields, and continu his research work in the Dicalite pro uct laboratories for the first 5 years his association.

Halvorsen is the author of seve technical papers, and has contribut to both paper industry and brewi publications. Among his technic society memberships he lists TAPP American Society of Sugar Beet Tec nologists, Master Brewers Associati of America, and others in the brewi and drycleaning fields.

NEW DATA SHEET

on Dicalite *BULK-AID* gives more complete information on physical and chemical properties, and on its advantages in papermaking. Write for your copy to Dicalite Dept., 612 So. Flower St., Los Angeles 17, Calif.

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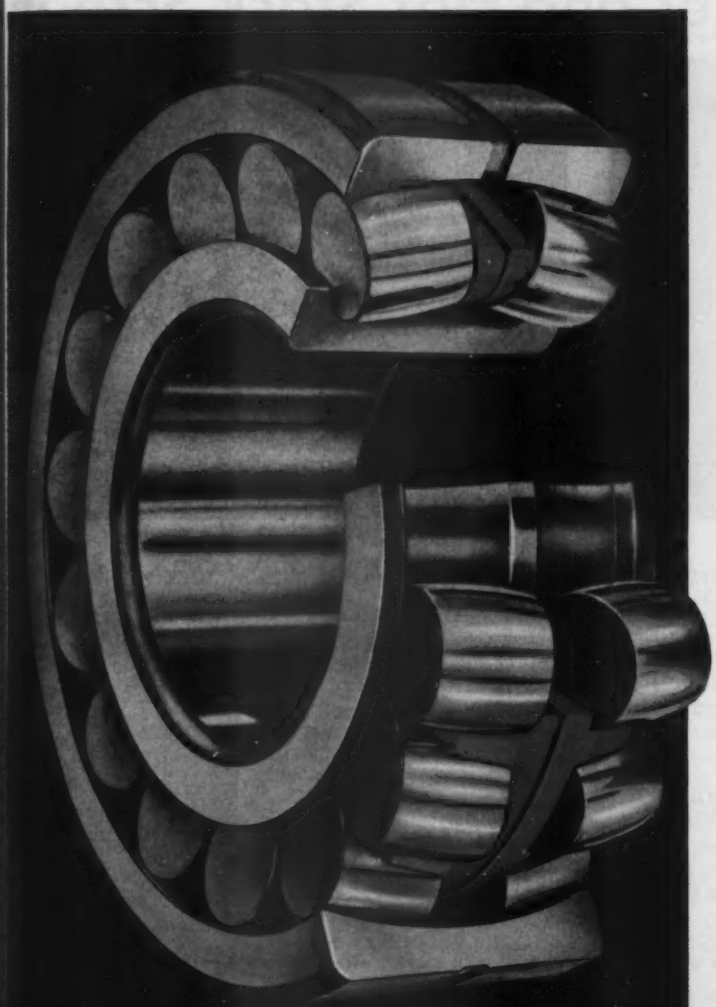

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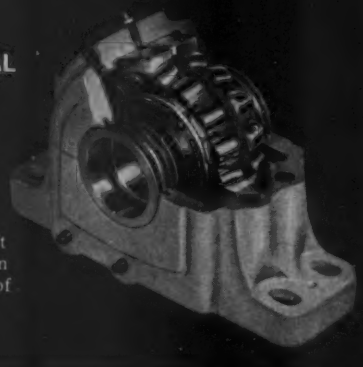

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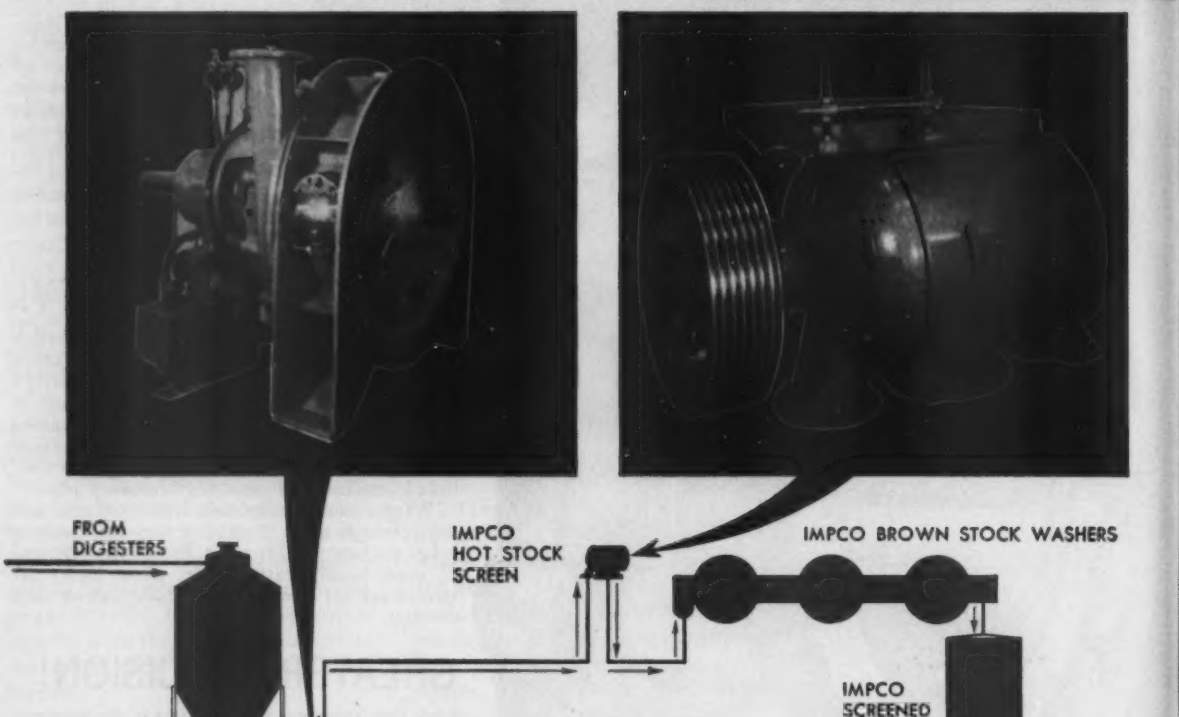

The new Impco Fibrilizer and Hot Stock Screen combination has opened the door to vast savings for the industry.

The Solvo Fibrilizer produces a combined action of pulp classification, complete soft knot defibering (not refining), hard knot shredding, higher initial yield and eliminates knot handling. Its built-in pumping action eliminates the need for a stock pump. All these operations are being accomplished for about one-half horsepower days per ton.

The new Impco Hot Stock Screen, installed directly ahead of the primary stage brown stock washer, is now producing quality pulps in several mills. This development virtually obsoletes the need for separate washed-stock screening of most paper and all board grade pulps.

The arrangement shown can be installed for high yield Kraft and Sulphite pulps with only the screen rejects requiring refining.

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CONTINENTAL CAN'S NEW PAPERBOARD MILL

A. W. J. Dyck

▶ The new mill features a 360 ton/day continuous digester equipped with the new diffusion-extraction system, the first economical cold soda pulping system, and a highly efficient four-stage bleach system.

CONTINENTAL CAN'S new $40 million paperboard mill, which recently went into production at Augusta, Georgia, is designed to make coated or uncoated board for cartons, boxes, etc., to be used in frozen food, dairy, bakery, meat and dry food packaging. Its daily output of paperboard is 350 tons.

Daily consumption of raw materials in the new mill amounts to 775 cords of pulpwood, 20,000,000 gal. of water, 26 tons of salt cake, 13 tons of lime, 23 tons of chlorine, 17 tons of caustic, clay, sodium chlorate, sulfuric acid, starch, etc.

Highlights of the new mill, which was engineered by J. E. Sirrine Co., include: (1) the continuous 350 ton per day digester incorporating the new Kamyr diffusion extraction system; (2) the first economical cold caustic pulping system using a single stage of pulp refining; (3) an extremely efficient 4-stage bleach system, featuring all-upflow type bleach towers and other advantages that have reduced chemical consumption by 10-15 per cent; (4) highly instrumented control systems including an automatic stock proportioning system that handles four different grades of stock to the paper machine; and (5) the 236-inch-wide board machine equipped with dual Champflex coaters.

Management of the Augusta mill includes William L. Schnorbach, plant manager; Raymond W. McCormick, general superintendent; Charles W. Ray, pulp mill superintendent; Brookshire C. Moore, paper mill superintendent; Vernon B. Bodenheimer, technical director; Robert Ervin, director of engineering and maintenance; John W. Robinson, finishing and shipping superintendent; Harold L. White, power superintendent; and Wesley Nooney, woodyard superintendent.

Woodyard operation

The woodyard consists of two pulpwood storage areas, 105 ft. wide and 800 ft. long, of 1 ft. thick concrete slab construction arranged on either side of the 1,000 ft. long log flume. The concrete slab construction facilitates trouble-free crane operation and complete wood removal so that no dirt is permitted to accumulate. A 10,000 gpm constant level pump keeps the water recirculating through the flume. A bark elevator, grit collector and rotating disc screen remove bark and other debris from the flume water.

A 124-ft. single chain conveyor conveys logs from the flume to a 66-in. belt conveyor which feeds two 12 ft. dia. by 67½ ft. long M-bar, chain suspended, three-section barking drums. The drums are equipped with heavy duty ductile iron sprocket rings and bronze lined bearings. A special feature of the drums is provided in the air-operated vertical gates at the discharge end for wood level control and discharge of barked logs. Two sections of each drum are driven by 150 hp motors through chain drives and gear units, while the third section is driven by a 75 hp motor.

The logs are then conveyed to a 110 in., 12-knife chipper driven by a 800 hp motor.

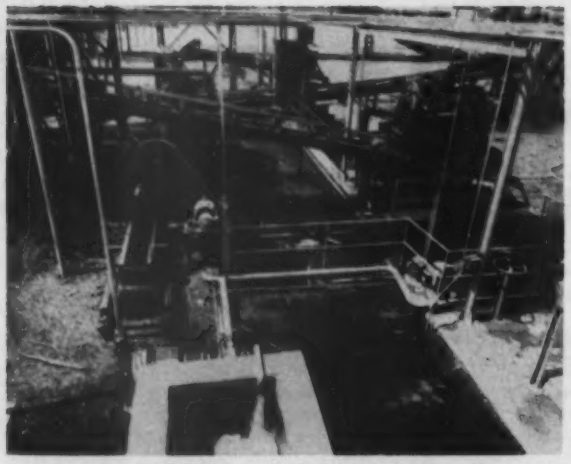
Bark from the drums and the flume is handled by a system of belt conveyors, double screw feeder and hopper and a pneumatic system which blows it to the bark hog and power boiler.

Chips are carried by a 18,000 cu. ft. per hr. capacity chip elevator to two Model 72 Rotex screens equipped with two screening surfaces and handling over 36 units of chips per hr. The screens operate

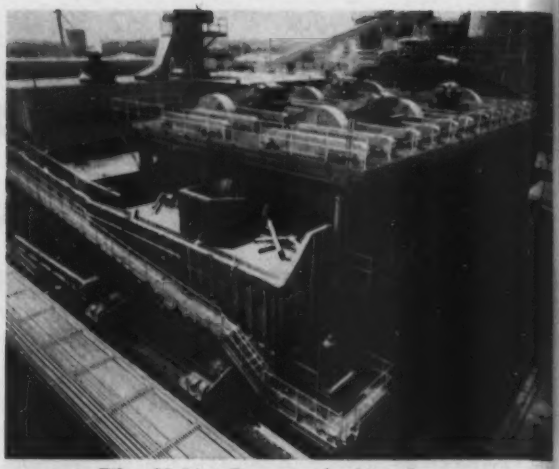
W. L. Schnorbach

V. B. Bodenheimer

R. McCormick

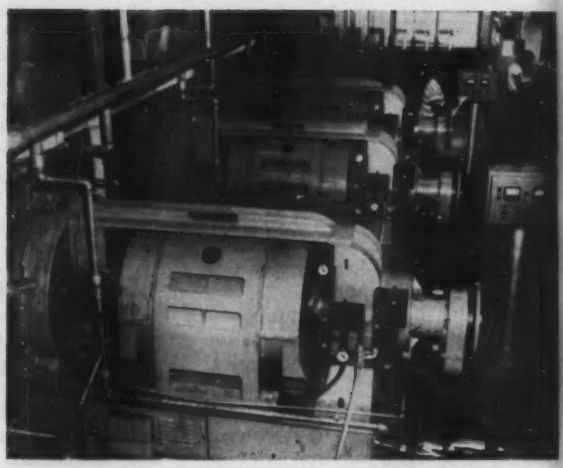


Link Belt grit collecting system.



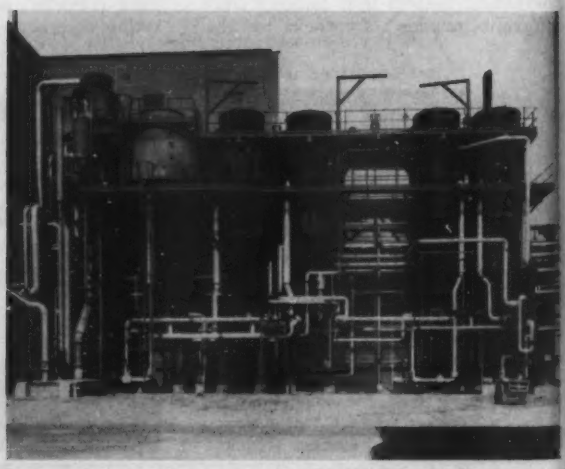
Fibre Making Processes barking drums.

Orville Simpson Co. Rotex screens.

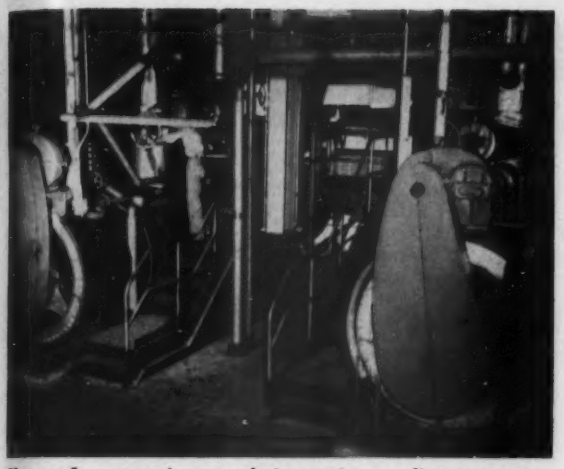


Sprout Waldron single disc refiners.

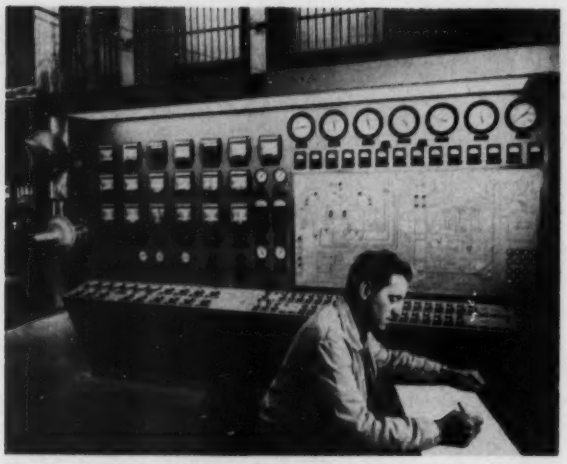
Improved Machinery brown stock washers.



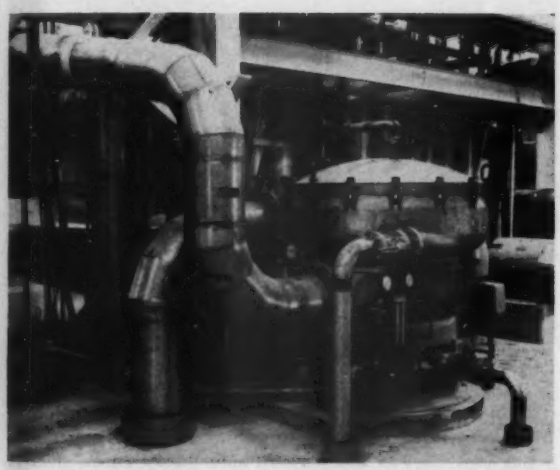
Swenson Evaporator Co. evaporator system.



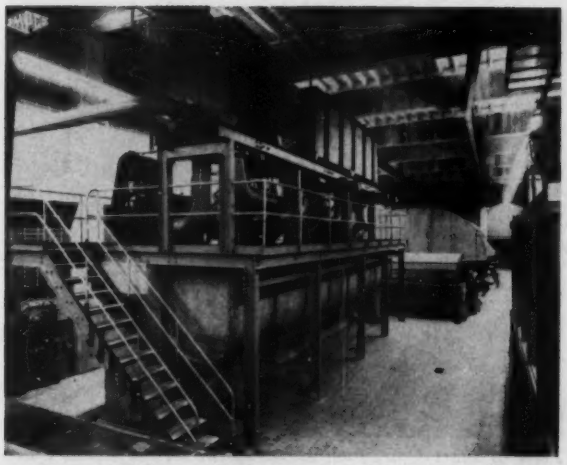
Kamyr Inc. steaming vessels in continuous digester system.



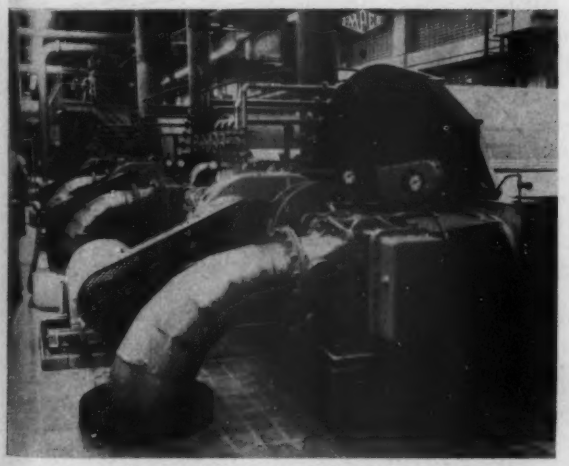
Foxboro central control panel for the Kamyr digester.



Bird Machine Co. Centriscreen for stock screening.

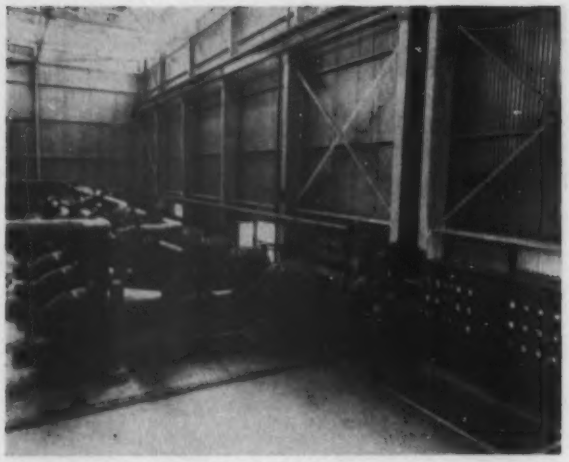


Impco A-25 centrifugal screens and vacuum decker.

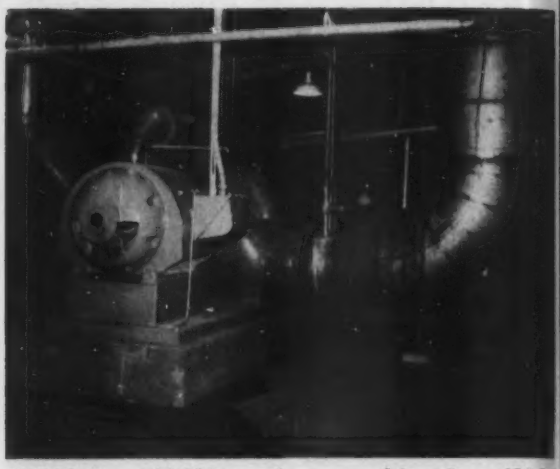


Impco washers and Series No. 300 thick stock pumps.

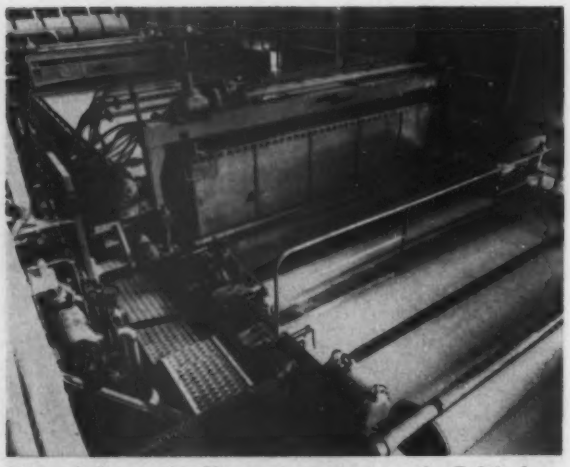
Foxboro control panel controls all bleaching operations.



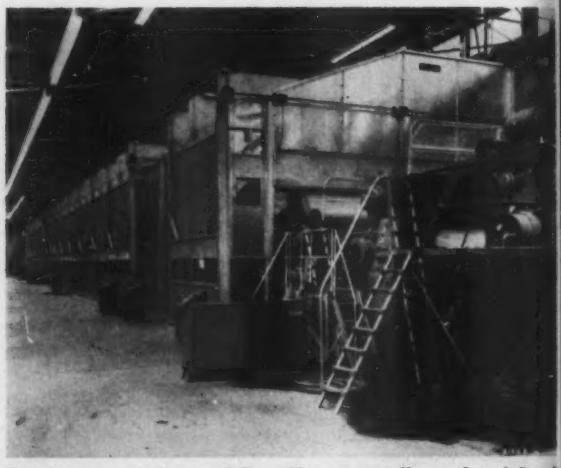
E. D. Jones Corp. jordans and Foxboro stock preparation panel.



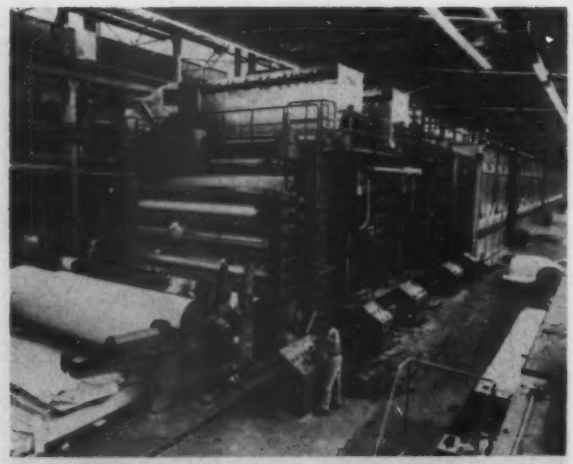
Allis-Chalmers 22,000-gpm fan pump driven by a 400-hp G. E. motor.



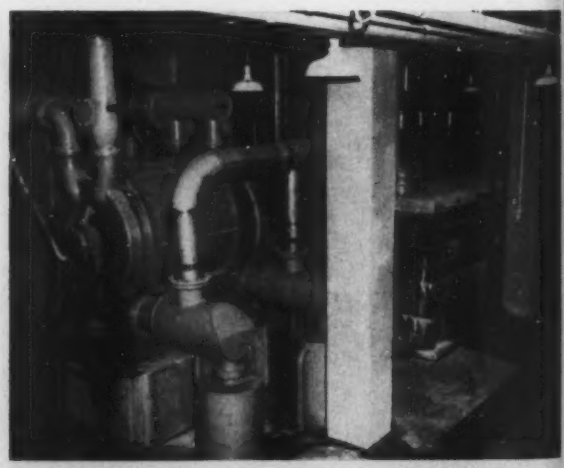
View of the two-headbox arrangement on the Beloit fourdrinier.



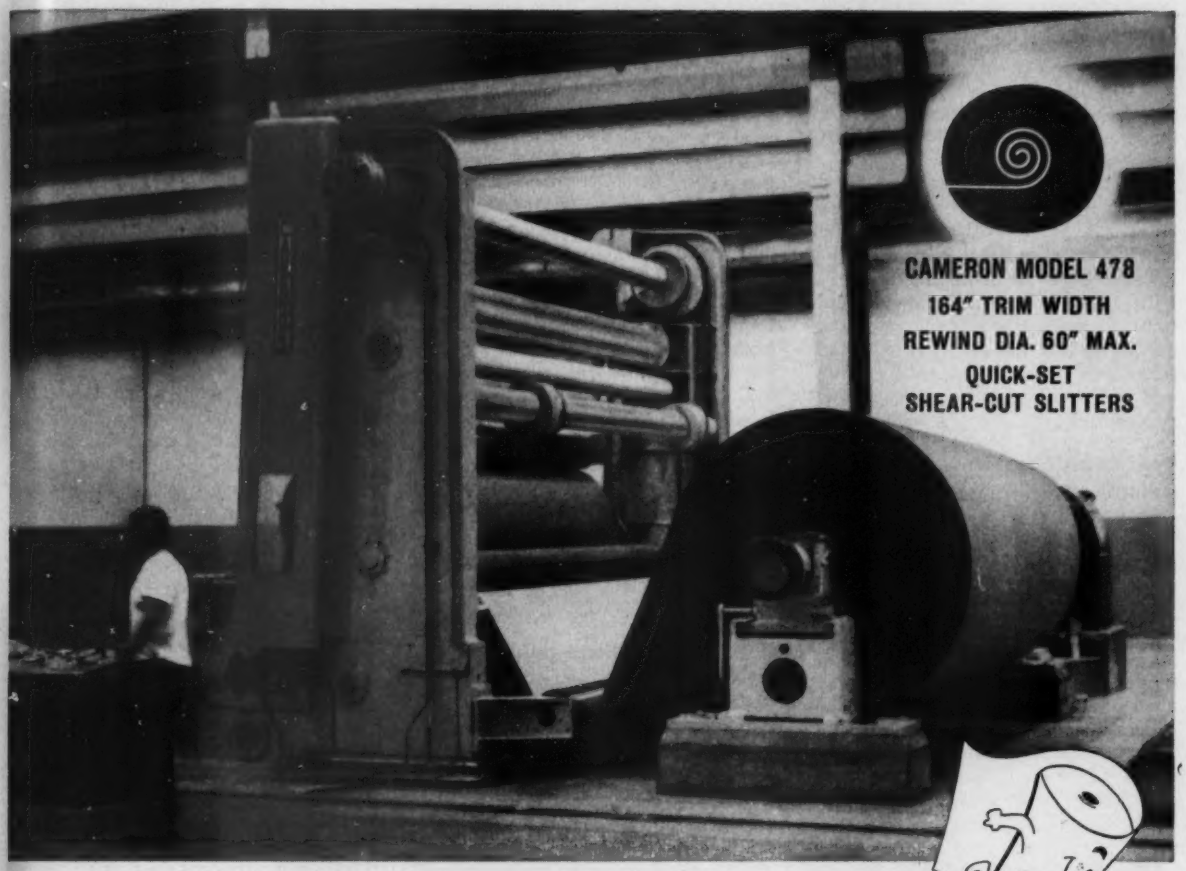
Beloit press section and Ross-Hooper totally enclosed hood over dryer sections.



Two Beloit Champflex coaters are located between two calender stacks.



Nash Engineering vacuum pumps provide vacuum for couch and presses.



Georgia-Pacific *delivers* the superb running qualities of The New Roll

One good reason why the Georgia-Pacific Paper Company has experienced such rapid growth as a kraft producer for West Coast and export markets is found in the superb running quality of the rolls shipped from the No. 2 machine at the company's Toledo, Oregon mill. Kraft papers and board up to 33 lb. basis weight are delivered in rolls made with extreme care to assure maximum trouble-free yield in high speed printing and converting operations. Also integrated roll control keeps the web *alive* for better end results, not stretched out *dead* in the rolls.

These fine Georgia-Pacific rolls are produced on a Cameron 478 unwinding-slitting-rewinding system, integrated and job-fitted by Cameron specialists for optimum unwind-to-rewind roll control. The heart of this Cameron 478 installation is a regenerative electrical unwind braking system which teams the main winder drive and an unwind braking generator under electronic amplifier controls to provide highly sensitive, continuous response to variations in web tension.

Among other roll control elements of the Cameron 478 are the isolated main drive gear box, down-pressure riding roll brakes, and cam-controlled, tapered automatic counterweighting. All roll control elements are adjustable to the characteristics of the paper or board to be run, the quality of the parent rolls, and the intended service of the finished rolls. The result is a fundamentally different kind of finished roll—a custom-made roll of superb running quality. We call it The New Roll.

Cameron specialists offer a unique test-run service to help you achieve the fine running qualities of The New Roll. In the Cameron Research & Development Service in Dover, N. J., test-runs are being made on all types of papers and board on integrated pilot systems which simulate actual job conditions. Here you can see, before you buy, either an improvement element, such as a new unwind brake and tension system, or a complete, integrated roll production system, engineered to give you The New Roll. Let's plan an early date for *your* test-runs. Write for details.

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famous TIDLAND pneumatic shafts are sold exclusively through Cameron

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with a horizontal gyratory motion which prevents up-ending of chips and is sufficiently vigorous to permit the use of a bottom sawdust screen with openings as fine as ⅛ in. for complete dirt and sawdust removal.

Accepted chips are carried by a 36-in.-wide belt conveyor to three 30 ft. dia., 225-cord capacity, tile lined chip silos.

Each of the chip silos is equipped with a 17-ft. dia. plate feeder and two vibrators. Two conveyor belts, one 20 in. and the other 30 in. wide, carry the chips to the cold caustic and the continuous digester systems respectively.

Cold caustic system

Hardwood chips are pulped in the cold caustic system of 125 tons per day capacity. The chips are first fractionated in a No. 3036 single runner fractionator (driven by a 75 hp motor) into ¼ in.-⅜ in. dia. sizes and are then blown into a 54-in. cyclone separator. From here they fall into a Type-304 stainless steel live-bottom bin containing a 25 g. per liter solution of sodium hydroxide which fills the bin to a depth of 10 ft. Chips are added to the bin in sufficient quantities to keep the bulk submerged in the caustic solution.

The bin is equipped with twelve 12-in. dia. screws, driven in groups of three by variable speed drives and feeding the 15-in. dia. cross conveyor driven by a separate constant speed drive. Chips are continuously discharged from the live bottom bin at the rate of 1,000 cu. ft. per hr., which permits a retention in the bin of approximately two hours.

The caustic-treated chips are then pumped by a 800 gpm ACAP pump to a No. 50 flat bed drainer conveyor, of stainless steel construction, which removes excess liquor and returns it to the live bottom bin while the chips are passed to six Uniflow Feeders each equipped with individual variable speed drive and remote control. The feeders provide even, surge-free feed of chips to six No. 36-2 single disc refiners, each driven by a 700 hp., 900 rpm synchronous motor. The six refiners are controlled from double refiner control panels housing tachometers, remote speed controls, ammeters, indicating lights, etc.

Immediately prior to entering the refiners, hydrogen peroxide bleach liquor is added to the chips so that it can be thoroughly mixed in the refiners. Stock from the single stage system of refining is passed to a raw stock chest for approximately 30 minutes retention time.

From the 19 ft. dia. by 11 ft. high tile-lined raw stock chest, stock is pumped to a centrifugal screen which drops it into a 6 ft. dia. by 11 ft. high screened stock chest. It then goes through three stages of Centri-Cleaners to a 11½ ft. by 12 ft. decker which discharges the dewatered stock to a 34 ft. dia. by 70 ft. high high-density storage tank. From here, it is pumped automatically to a 12 ft. dia. by 20 ft. high high-consistency chest supplying the paper machine.

Cold caustic pulping is controlled from a panel equipped with controls for chip bin levels, caustic flows, water to refiners, refined stock chest and caustic chest levels, chip weight, live bottom bin liquor level, steam to cold caustic area, peroxide to refiners, etc. The panel also houses totalizers for chips, steam and peroxide.

Continuous sulfate pulping and washing

Chips from the 30-in.-wide belt conveyor fall into two chip bins over the 350 ton per day capacity continuous digester. From the bins, chips pass down through a two-ferris-wheel type meter, equipped with a five-pocket rotor, to two rotating low pressure feeders which feed two steaming vessels. These are 58 in. in dia. by 24½ ft. long equipped with screw conveyor to move the chips to the discharge end. The presteamed chips then fall into a chute and enter the two high pressure feeders which, rotating at 4-6 rpm, continuously transfer the chips from a 15 psi to a 165 psi pressure system.

The top of the 114 ft. digester is equipped with a cylindrical, slotted strainer which separates the liquor and returns it to the high pressure feeder system, while the chips pass down the digester in a solid plug.

The temperature in the 1/3 upper zone of the digester is 240° F, which is the temperature of the active alkali solution added. Immediately below this zone, liquor is removed through strainers, passed through an indirect heat exchanger which heats it to about 300° F, and is then returned to the heating zone through a pipe passing vertically down through the center of the digester. Following the first heating zone, another set of strainers removes the liquor which is heated to about 330° F, and returned through another pipe located inside the pipe supplying the first heating zone, but extending into the second zone.

A special feature incorporated in this digester is the latest Kamyr Diffusion-Extraction system which cools the chips down to about 240° F prior to leaving the digester. Cooling is achieved by introducing spent black liquor from the brown stock washing system through an insulated pipe running inside the second zone heating pipe and extending into the bottom zone of the digester where it terminates in two sets of nozzles. The cold dilute black liquor thus displaces the hot high solids liquor, the latter leaving the digester through a set of strainers and then passing through two flash tanks for heat recovery. This system designed for uniform cooling with maximum heat recovery has the added advantages of facilitating brown stock washing and more economical black liquor evaporation.

The digested chips are discharged with the aid of a scraper into the blow tank through a blow unit and two valves.

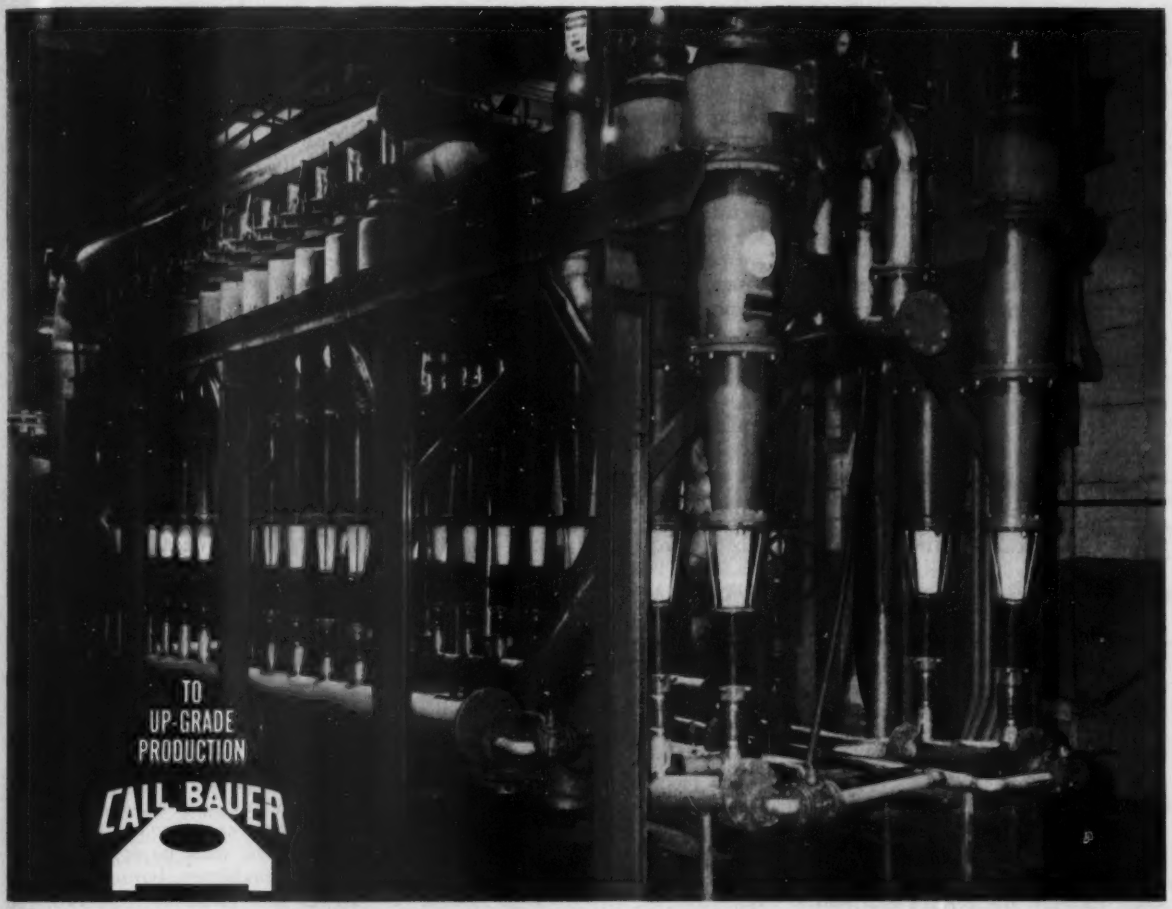
Digester operations are controlled from a graphic control panel equipped with motor pushbotton controls; recording controllers for steam and liquor flows, temperature and pressure; steam pressure and water load indicators; and alarm system for critical points. All recording controllers on this panel, as well as on other panels installed in this mill, have the new "Scan-Fold" strip charts which are backlighted for easy reading. All instruments are Model 54's which can be pulled out of their chassis housings for servicing without disrupting the process.

From the blow tank, stock is passed to a Claffin refiner where large knots are broken up to facilitate washing and reduce foaming on the washers.

The three-stage brown stock washer system has three counter current washers of 11½ ft. dia. by 16 ft. long equipped with showers and scrapers. Brown stock washing is controlled from a panel which houses recording controllers for flows, liquor density, conductivity of last stage filtrate, vat levels, etc; pushbuttons to operate motors, etc.; and rheostats for drum rotation speed. A type CP Position Transmitter is mounted at the last washer to measure and control pulp sheet thickness by varying the vat level.

From the brown stock washers, stock goes to a round, 40-ton low density blending chest equipped with a U-shaped midfeather or baffle.

From here it goes to three type



Battery of Bauer No. 623 Centri-Cleaners on No. 4 machine at St. Croix Paper Company. Note long lasting ceramic lower cone nozzles and vacuum rejects-separator system which reduces wear on cleaners in the second and third stages of this modern installation.

Bauer Centri-Cleaners Improve Quality, Reduce Downtime at St. Croix

St. Croix Paper Company, Woodland, Maine, produces 500 tons of newsprint per day from pulp cleaned 100% with Bauer Centri-Cleaners.

Since all machines have been equipped with these cleaners, mill management reports a profitable improvement in sheet quality. The paper runs better, prints better and sells better. Wire and felt life have been improved, also.

If you want to up-grade quality in your mill, talk it over with your local Bauer man. He can recommend the exact cleaner for your needs. Send for bulletin P-4.

Continuous or rapid cycle cooking and impregnation... DIGESTERS	Liquor removal... PRESSAFINERS	Improved fiberizing of chips, higher machine speeds... DOUBLE REVOLVING DISC REFINERS	Final stock preparation PUMP THROUGH REFINERS	Cleaner stock... CENTRI-CLEANERS	Automated high yield systems ...BAUERITE

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A44 primary screens and a A25 secondary screen. Each of the primary screens is capable of handling from 150-250 tons of pulp per day, depending on whether hardwood or softwood pulp is being screened. Accepted stock goes to a decker and then to a 17-ton capacity, low density screen stock chest or to a 150-ton unbleached high density storage tank.

An interesting procedure in the screening system is the chlorination of rejects from the secondary screen. The rejects are first passed through a No. 36-2 single disc refiner driven by a 450 hp motor and then through a series of centrifugal cleaners to two vibrating screens and a small 17 ft. dia. by 27 fr. high chlorination tower. The chlorinated stock goes to a washed stock chest for a mild alkaline extraction and is then returned to the screens for re-screening.

This process achieves a recovery of all but 3 per cent of the rejects normally amounting to some 2.5-3.0 per cent of the total pulp. Chlorine consumption in this operation is about 12 per cent.

Impco bleach system

The four-stage bleach plant installed at this mill is designed for maximum efficiency. It is an all-upflow system, with uniform flow of stock through the towers and with mechanical equipment per bleaching stage reduced to a minimum. The improved flow design has led to a 10-15 per cent reduction in chemical consumption at no sacrifice of the 85 GE pulp brightness. Another interesting feature of this system is that it makes use of thick stock pumps for stock mixing which is done under pressure.

Stock is pumped from the screen stock chest to the bottom of an 18 ft. dia. by 77 ft. high upflow chlorination tower where chlorine is added through a Series 300 line-type chlorine mixer. The chlorine tower is equipped with Type 122 circulators and with an agitator at the top. Stock drops from the top of the chlorination tower to the 42-ft. bleach plant operating level where it is diluted with water from the chlorination seal pit and washed in a 11½ ft. dia. by 16 ft. stainless steel washer equipped with Fiberglass hood. Caustic is added from a weir on the top of the washer. Since the caustic and hypochlorite stages in this bleach system are interchangeable, hypochlorite may be added at the repulper if desired.

The chlorinated, washed stock is then pumped by a Series 300 thick stock pump into the 10 ft. dia. by 84 ft. high upflow caustic or hypo tower, depending on what stage succeeds the chlorination stage. This tower has a cone-shaped bottom without spreader. At the top it is equipped with a dry stock scraper which removes dry stock and drops it into a chute that leads through a swirl mixer located slightly above washer operating level. This arrangement results in air-free stock being fed to the 9 ft. dia. by 16 ft. caustic washer and limits the hydraulic head required for dilution with return water from the caustic seal pit.

Hypochlorite is added at the repulper of the caustic washer. The repulper screw extends into the eye of the fixed stock pumps the stock under pressure through a mixer into the bottom of the 12 ft. dia. by 84 ft. high up-flow hypochlorite tower. This tower is identical in construction to the caustic tower. Hypochlorite bleached pulp is scraped off the top, diluted in a swirl mixer with water from the hypochlorite seal pit and washed on a hypochlorite washer.

It is then pumped by a thick stock pump from the repulper through a single shaft steam mixer, then through a chlorine dioxide mixer into the bottom of the 18 ft. dia. by 84 ft. high upflow chlorine dioxide tower.

Tower construction and operation is similar to that of either the caustic or the hypo towers. The chlorine dioxide bleach stock goes through a swirl mixer and then to the washer similar to the preceding operations.

A novel feature of the hypochlorite and the chlorine dioxide towers is the brightness meter which measures pulp brightness in these towers seven minutes after the bleaching chemicals are added. This enables the meter to efficiently control the addition of hypochlorite and chlorine dioxide to maintain constant pulp brightness from these stages. Another interesting feature is the pH samplers installed on the high density bleach towers at about 4 ft. below the dry scraper outflow.

Bleaching is controlled from the bleaching panel which houses such instruments as oxidation-reduction potential for chlorination control; consistency controllers; controllers for chest level, mixer temperatures, flows, etc; pH controllers for tower discharge, etc; remote manual operating station for control valves; and on-off buttons for pumps, agitators, screens, deckers, repulpers, etc.

Stock from the ClO_2 washer is conveyed to one of the four 30 ft. dia. by 60 ft. high, 150-ton capacity high density storage tanks of tile construction.

From here it is pumped automatically into one of three consistency chests. The pump performing this function starts and cuts in dilution water when the consistency chest is 1/3 full, and stops automatically when the consistency chest is completely full.

From the consistency chest, stock is pumped through consistency regulators and then through magnetic flow meters to the paper machine.

Stock consistencies, flows and stock levels are controlled from the stock preparation panel. The stock proportioning system is a ratio system which automatically controls four furnishes simultaneously to the paper machine through magnetic flow meters.

Chemical recovery

Spent black liquor from the digester and from the brown stock washers is pumped to the 5-stage evaporator system where it is concentrated to 52 per cent solids. These evaporators have a designed evaporation capacity of 300,000 lbs. per hr. The unit is equipped with surface condenser, barometric condenser and stainless steel tubes in all effects.

Liquor is removed from the evaporators during the evaporation process at about 22.5 per cent solids, for soap removal in the skim tank, and then returned to the next stage of evaporation. Soap recovery amounts to about 50,000 lbs. per day. Concentrated liquor from the evaporators is stored in a 30 ft. high tank.

Concentrated liquor is pumped to the wet bottom precipitator to collect chemicals recovered from the flue gasses. The precipitator is designed to operate at an efficiency of 98 per cent. The enriched liquor then goes to the cyclone evaporator where it is further concentrated to 65 per cent solids. It is strained and pumped to the salt cake mix tanks where additional makeup chemicals are added.

The concentrated liquor is burned in the recovery furnace designed to generate 168,000 lbs. of steam per hour at 875 psi and 900° F. This fuel source supplies 40 per cent of the mill's steam requirements. An unusual feature of the recovery boiler is its aluminum siding construction which shows no signs of corrosion.

The smelt from the recovery sys-

tem is dissolved in the dissolving tank and treated in a conventional causticizing and clarifying system.

Lime mud from the causticizing system is washed and subsequently dewatered in a centrifuge to increase kiln economy and efficiency. The kiln is 9 ft. in dia. by 250 ft. long, operates at a temperature of 2,100°—2,200° F (at the discharge end) and is equipped with scrubber. A drag chain conveyor carriers the hot lime from the kiln discharge to the primary lime slacker or the lime bin.

Paper making

Stock from the three consistency chests is passed through two Type K22S Kalle consistency regulators and then through magnetic flow meters for measurement and automatic proportioning for both top and base sheets. Stocks handled by the system consists of bleached pine, semi-bleached pine, unbleached pine, mixed pine and hardwood, and cold caustic.

Cold caustic stock passes through a Claflin and then to a refined stock chest.

Base liner goes to a surge chest and then through a series of jordans to the refined stock chest. From here, through tickler jordans into the machine chest.

Top liner stock goes from the consistency chest through 8 refiners driven by 500 hp motors, to the secondary machine chest headbox. The refiners are equipped with stainless steel ⅜ in. and ¼ in. tackle.

The four paper mill chests are horizontal chest, 44½ ft. long, 16 ft. wide and 17 ft. high, with single horizontal circulators at one end.

Stock for the base sheet is pumped from the primary machine chest to a stock flow box and then through a combination centri-cleaner and decolator unit to the primary headbox.

Top liner stock from the secondary headbox machine chest passes through a Centriscreen and then to the secondary headbox system. Rejects from the Centriscreen go through six Cycleans and are returned to the Centriscreen for re-screening.

The fourdrinier section of the paper machine has a 236 in. wide and 165 ft. long wire, a primary and a secondary air-cushion type headbox, 10 suction boxes, a 42 in. dia. suction couch roll, a 28 in. dia. lump breaker roll, a 36 in. dia. wire turning roll and a 24 in. dia. dandy roll.

The press section consists of 1st suction press, 2nd suction press, 3rd

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Swenson engineers are acknowledged masters in the field of evaporation, as well as crystallization, filtration, pulp washing and spray drying. And the wealth of their experience can be made available to you. We welcome the opportunity to survey your evaporator problems.

FREE: Bulletin SW 205, *Forced Circulation Evaporators,* complete with charts and diagrams—well worth the reading time. Write to: Swenson Evaporator Company, 15653 Lathrop Ave., Harvey, Illinois. In Canada: Whiting Corporation (Canada) Ltd., 350 Alexander Street, Welland, Ontario, Canada.

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Principal equipment installed at Continental Can's Augusta mill

Contracting engineers: J. E. Sirrine Co.

Woodyard operation

Bark conveyors, for handling bark from barking drums and grit system to storage tower, including double screw feeder and hopper under bark screen and bark log — Link Belt Co.

Barking drums (2), 12 ft. dia. by 67½ ft. long M-bar, chain suspended, 3-section drums, with air-operated vertical gates at discharge end — Fibre Making Processes Inc.

Chip elevator, 18,000 cu. ft./hr. capacity — Link Belt Co.

Chipper, 110-in., 12-knife driven by 800 hp motor — Hansel Engineering Co.

Chip silos (3), 30 ft. dia., 225-cord capacity, tile-lined, equipped with a 17 ft. dia. plate feeder and two vibrators — Stebbins Engineering & Mfg. Co.

Flume water circulating pump, (10,000 gpm), vertical propeller type — Byron Jackson Pumps Inc.

Grit collecting system, consisting of bark elevator, disc screen and grit collector — Link Belt Co.

Log conveyors — B. L. Montague Co. Inc.

Pneumatic blower system — Bader Pneumatics Inc.

Rotex screens (2), Model 72, 36 units capacity, equipped with two screening surfaces, bottom sawdust screen with ⅛ in. openings — Orville Simpson Co.

Cold caustic system

ACAP pump (800 gpm) — Allis-Chalmers Mfg. Co.

Centri-cleaners — Bauer Bros. Co.

Centrifugal screen — Bird Machine Co.

Cyclone separator, 54-in. — Sprout Waldron & Co. Inc.

Flat bed drainer conveyor, No. 50, stainless steel construction — Sprout Waldron & Co. Inc.

Fractionator, No. 3036, single runner driven by a 75 hp motor — Sprout Waldron & Co. Inc.

High-consistency chest, 12 ft. dia. by 20 ft. high of tile construction — Stebbins Engineering & Mfg. Co.

Instrument panel, equipped with controls for chip bin levels, caustic flows, water to refiners, refined stock chest and caustic chest levels, chip weight, live bottom bin liquor level, steam to cold caustic area, peroxide to refiners, totalizers for chips, steam and peroxide — Foxboro Co.

Live-bottom bin, Type-204 stainless steel; equipped with twelve 12-in. dia. screws driven in groups of three by variable speed drives; and a 15-in. dia. cross conveyor driven by a separate constant speed drive — Sprout Waldron & Co. Inc.

Refiner control panels (2), with tachometers, remote speed controls, ammeters, indicating lights, etc. — Sprout Waldron & Co. Inc.

Single disc refiners (6), No. 36-2, each driven by a 700 hp synchronous motor — Sprout Waldron & Co. Inc.

Stock chest, raw, 19 ft. dia. by 11 ft. high, tile-lined — Stebbins Engineering & Mfg. Co.

Stock chest, tile construction, 6 ft. dia. by 11 ft., for screened stock — Stebbins Engineering & Mfg. Co.

Storage tank, 34 ft. dia. by 70 ft. high, of tile construction, for high-density stock — Stebbins Engineering & Mfg. Co.

Tile construction and linings — Stebbins Engineering & Mfg. Co.

Uniflow feeders to refiners (6), equipped with individual variable speed drive and remote control — Sprout Waldron & Co. Inc.

Continuous sulfate pulping and washing

Blending chest, 40-ton, low density, equipped with U-shaped midfeather — Stebbins Engineering & Mfg. Co.

Brown stock washer system, three counter current washers of 11½ ft. dia. by 16 ft. long, equipped with showers and scrappers — Improved Machinery Inc.

Chlorination tower, for screen rejects, 17 ft. by 27 ft. high — Improved Machinery Inc.

Claflin refiners, Emerson — John W. Bolton & Sons Inc.

Controllers, Model 54's with "Scan-Fold" strip charts backlighted — Foxboro Co.

CP Position Transmitter — General Electric Co.

Cycleans, free vortex, drop-in-pressure units — Bird Machine Co.

Decker — Improved Machinery Inc.

Digester, 400 ton/day capacity, continuous equipped with two heating zones, heat exchangers, and diffusion-extraction system — Kamyr Inc.

Disc refiner, No. 36-2 single, driven by a 450 hp motor — Sprout Waldron & Co. Inc.

Feeders (4) two rotating, low pressure, and two high-pressure, rotating at 4-6 rpm — Kamyr Inc.

Flash tanks (2), for digester heat recovery — Kamyr Inc.

Graphic control panel, equipped with motor pushbutton controls; recovery controllers; steam pressure and water load indicators; and alarm system for critical points — Foxboro Co.

Meter, two-ferris-wheel type, equipped with a five-pocket rotor — Kamyr Inc.

Brown stock washer control panel, housing recording controllers for flows, liquor density, conductivity of last stage filtrate, vat levels, etc., pushbuttons to operate motors etc., and rheostats for drum rotation speed — Foxboro Co.

Screens, centrifugal, stainless steel primary type A44, 150-250 ton/day capacity; secondary type A25 — Improved Machinery Inc.

Steaming vessels (2), 58-in. in dia. 24 ft. long, equipped with screw conveyor — Kamyr Inc.

Tile construction and linings — Stebbins Engineering & Mfg. Co.

Vibrating screens (2), for chlorinated rejects — Improved Machinery Inc.

Impco bleach system

Bleach panel, housing oxidation-reduction potential consistency controllers, controllers for chest level, mixer temperatures, flows, pH controllers remote manual operating station, and on-off button — Foxboro Co.

Bleach towers, upflow type, equipped with dry stock scrapers: (1) one caustic 10 ft. dia. by 84 ft. high with cone-shaped bottom; (2) one hypo 12 ft. dia. by 84 ft. (3) one chlorination 18 ft. dia. by 77 ft. with Type 122 circulators and series 300 line-type chlorine mixer; and (4) one ClO_2 18 ft. dia. by 84 ft. — Improved Machinery Inc.

Chlorine dioxide generating system — Olin Mathieson Chemical Corp.

Consistency regulators — DeZurik Corp.

Consistency regulators, Model 16C2381A, pipe line, equipped with steam float, pneumatic force transmitter, and 2-per recording controller — Fischer & Porter Co.

Magnetic flow meters — Foxboro Co.

Pumps — Allis-Chalmers Mfg. Co.

Storage tanks, high density (4), 30 ft. dia. by 60 ft. high, 150-ton capacity, tile construction — Stebbins Engineering & Mfg. Co.

Tile construction and linings — Stebbins Engineering & Mfg. Co.

Washers (4), equipped with pulpers one 11½ ft. dia. by 16 ft. stainless steel, equipped with fiberglass hood; three 9 ft. dia. by 16 ft. — Improved Machinery Inc.

Chemical recovery

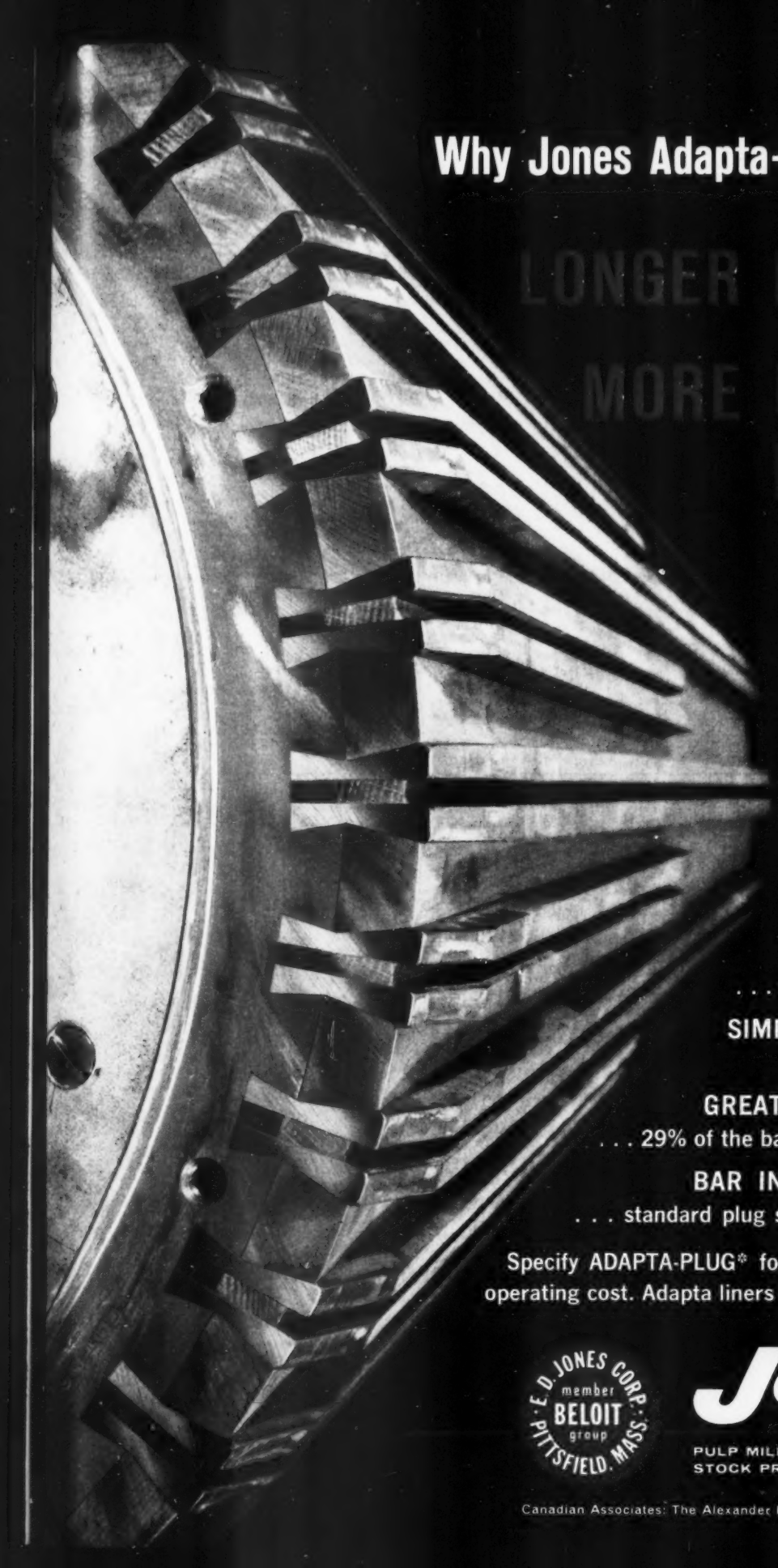
Causticizing and clarifying system, conventional — Dorr Oliver Inc.

Cyclone evaporator — Swenson Evaporator Co.

Evaporator pumps — Worthington Corp.

Evaporator system, quintuple effect with surface and barometric condensers, 300,000 lbs./hr. evaporating capacity, stainless steel tubes — Swenson Evaporator Co.

Kiln, 9 ft. in dia., 250 ft. long, operated at a temperature of 2,100° F. equipped with scrubber — F. L. Smidth Co.



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Canadian Associates: The Alexander Fleck Ltd., 75 Spencer Street, Ottawa

Lime-mud centrifuge ..... Bird Machine Co.
Recovery furnace, generates 158,000 lbs. steam per hour at 675 psi and 900° F. with aluminum siding ..... Babcock & Wilcox Co.

Paper making

Air system, consisting of hood, four-section design, measuring 16 ft., 115 ft., 60 ft., and 32 ft., polished wire glass windows, sliding panels and windows; dew point control system; Grewin units; trim conveying unit; bottom felt supply unit; and air make-up unit ..... J. O. Ross Engineering Co.
Broke conveyor ..... Link Belt Co.
Calender stacks (2) ..... Beloit Iron Works
Cleaners and decolator unit ..... Clark and Vicario Co.
Champflex coaters (2) ..... Beloit Iron Works
Circular knife grinding machine, Model SK 24 ..... Hanchett Mfg. Co.
Claflins, Emerson ..... John W. Bolton & Sons Inc.
Compressors (7) air, three 10½ by 11½ by 8½ in. XLE two-stage, driven by 200 hp motors; two 7 by 8 in. ESV-NL single-stage non-lubricated, driven by 25 hp motors; one 12 by 9 in. ESV-NL single-stage non-lubricated, driven by a 75 hp motor; and one Type 30, Model 10TD ..... Ingersoll-Rand Co.
Consistency regulators ..... Fischer & Porter Co.
Cutter-layboy, 226-in. rotary ..... Clark-Aiken Co.
Cycleans (6) free vortex, drop-in-pressure units ..... Hanchett Mfg. Co.
Dryer drainage system ..... Mason Neilan
Dryer section consisting of 72 paper dryers, 6 Feeney dryers and 16 return felt dryers—all 60-in. dia. ..... Beloit Iron Works
Fourdrinier section, 236-in. wide and 165 ft. long wire, a primary and secondary air-cushion type headboxes, 10 suction boxes, 42-in. dia. suction couch roll, 20-in. dia. lump breaker roll, 36-in. dia. wire turning roll and a 24-in. dandy roll ..... Beloit Iron Works
Jordans ..... E. D. Jones Corp.
Kalle consistency regulators (2) Type K22S, with "floating discs" sensing element ..... Rosenbald Corp.
Knife grinding machine, Model AK, 150-in. capacity, with hydraulic transmission, 15 hp motor, and 20-in. grinding wheel clock ..... Hanchett Mfg. Co.
Magnetic flow meters ..... Foxboro Co.
Pacemaker trimmer, Model 55-T-77 electronic ..... The Lawson Co.
Pneumatic-type heavy-duty reel ..... Beloit Iron Works
Press section, 1st and 2nd suction; 3rd plain hot press; and fourth smoothing press ..... Beloit Iron Works
Refiners (8), driven by 500 hp motors, equipped with stainless steel ⅜-in. and ¼-in. tackle ..... E. D. Jones Corp.
Rewinder (4,500 fpm), Model L, equipped with roll ejector, shaft puller, roll handling table and finishing roll conveyor ..... Beloit Iron Works
Save all, 11½ by 20 ft. stainless steel, with underjet doctor takeoff ..... Improved Machinery Inc.
Slitter winder, 80-in., automatic pick-up unwind stand ..... Cameron Machine Co.
Tile construction and lining ..... Stebbins Engineering & Mfg. Co.

Chemical additives

Kady mills (2) Model 4BH, 100 gal. capacity ..... Kinetic Dispersion Corp.
Lime unloading and handling system consisting of 10 ton/hour screw conveyor, drag chain conveyor and bucket elevator ..... Link Belt Co.
Rosin size emulsifier ..... American Cyanamid Co.
Starch unloading, conveying and batching system, consisting of blower to activate airslide car; a Pneu-Flow positive pressure system, handling 20,000-25,000 lbs of starch per hour; a Pneu-Flow positive pressure conveying system, handling 6,000 lbs./hr.; horizontal track screw, twin screw unloaders and steel storage tanks, etc. ..... Sprout Waldron & Co. Inc.

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MAIN OFFICE — Big Rapids, Michigan WEST COAST — Portland 1, Oregon

HANCHETT GRINDERS

For more data circle 116 on Post Card

Power plant

Ash handling system, 15 tons/hr. capacity, including refractory lined, Hydroseal ash handling pump and storage bin ..... Allen-Sherman-Hoff Co.

Blowhog, Type ER58D415F Montgomery Eat-Rite Hog ..... Jacksonville Blow Pipe Co.

Boiler, bark burning, 400,000 lbs. of steam per hour, designed to burn gas, oil or coal ..... Babcock & Wilcox Co.

Power distribution system ..... General Electric Co.

Refuse fuel proportioner, handling 100,000 lbs of bark per hour, with chutes and five feeders, and rotating distributor ..... Riley Stoker Corp.

Steam turbine generator, 25,000/32,000-KW, designed for extraction at 180 psi and 80 psi; with oil-relay governor ..... General Electric Co.

Water treatment

Boiler water treatment system, consisting of two activated carbon filters and 10½ ft. dia. anion and cation units .... Graver Water Conditioning Co.

Pumps (3), transfer, 8,000 gpm ..... Hydrodynamics Division

Pumps (3), vertical type 9,000 gpm, driven by 250 hp motors ..... Hydrodynamics Division, Food Machinery & Chem. Corp.

Reactivators (2), 105 ft. dia., 20 ft. high ..... Graver Water Conditioning Co.

Reto-Rake clarifier, 150 ft. dia. with sloped side walls and a drive mechanism that operates under conditions of 400,000 ft. lbs. torque ..... Graver Water Conditioning Co.

Sand filters (12), 40 ft. long, 13 ft. wide ..... Graver Water Conditioning Co.

Traveling water screen, Model No. 45A, 10 ft. wide tray, 36 ft. shaft centers, (26,100 gpm) ..... Link Belt Co.

plain hot press, and 4th smoothing press.

The dryer section has 72 paper dryers, 6 Feeney dryers, and 16 return felt dryers. The dryers, all 60 in. in diameter and designed for operating pressures of 125 psi, are divided into five sections. The breaker stack is located between the 3rd and 4th sections, and the horizontal size press between the 4th and 5th sections.

Following the 5th dryer section, is the first calender stack consisting of a king roll, queen roll and six calender rolls.

Two Champflex coaters follow the first calender stack. These coaters differ from the trailing blade coaters in the use of a small-diameter rotating rod held in a spring mounting to doctor off excess coating. Each of the Champflex coaters is served by a gas fired air cap dryer. A second calender stack; a pneumatic-type heavy-duty reel; and the Model L double drum, 4,000 fpm rewinder equipped with roll ejector, shaft puller, roll handling table, and finishing roll conveyor complete the dry end of the paper machine.

The paper machine is designed for speeds up to 2,000 fpm. It is driven by a 2,350 hp steam turbine through a differential drive system.

In the finishing area is, (1) an 80-in. slitter winder with automatic pick up unwinding stand, (2) a 226-in. rotary cutter-layboy, and (3) a Model 55-T-77 electronic Pacemaker trimmer.

Broke from the machine is repulped in a broke pulper located under the calender stack. Broke falls directly into the pulper from the calender while broke from the dryers is collected and conveyed into the pulper by a belt conveyor.

The dryer drainage system is of a typical cascade type. The dryers up to the size press are on pressure control while a group of dryers immediately preceding the size press is on moisture control, and all felt dryers are controlled as a separate group on differential control with the main bank of dryers.

Compressed machine and instrument air is supplied by 7 air compressors; three 18½ by 11½ by 8½ in. XLE two-stage compressors driven by 200 hp motors; two 7 by 8 in. ESV-NL single-stage non-lubricated compressors driven by 25 hp motors; one 12 by 9 in. ESV-NL single-stage non-lubricated compressor driven by a 75 hp motor; and one Type 30, Model 10TD compressor.

Air system

The dryer section is totally enclosed by a hood which is divided into four sections measuring 16 ft., 115 ft., 60 ft., and 32 ft. Polished wired glass windows at eye level run the entire length of the hood, while sliding panels and windows are located in the rear.

Level and even drying across the web is insured by the dew point control system which automatically opens and closes dampers on the exhaust system to keep the required humidity within the hood. Heat build-up in the dryer section, during a paper break, is prevented by automatic opening of the panels and dampers to admit a full flow of air through the hood.

The air system also includes Grewin units, provision for full heating and ventilation both at the wet and dry ends, trim conveying unit, bottom felt supply unit, air make-up unit at the wet end supplying filtered air and calender cooling.

Chemical additives

For convenience, the chemical additives area is located adjacent to the stock preparation area. Starch is received in air slide cars and then handled by an elaborate bulk starch unloading, conveying and batching system. This includes (1) a blower to activate the air slide car, (2) a Pnew-Flow positive pressure conveying system that handles 20,000-25,000 lbs. of starch per hour from the rail cars to the storage tanks, (3) two bolted steel storage tanks with twin screw unloaders, (4) Pnew-Flow positive pressure conveying system for handling 6,000 lbs. of starch per hour from storage to the scale hopper, (5) special scale hopper 1,000 cu. ft. capacity with screw conveyor discharge and two-way diverter valve to mixers or to two 180 gal. Kady mills.

Clay is received as a slurry and stored in a 21,000 gal. tank. Rosin is received and stored as a 70 per cent rosin size and subsequently diluted to a 3 per cent emulsion in an automatic rosin size emulsifier. Alum is received as a 36° Baumé solution and stored as such.

Power plant

In addition to the recovery furnace described under chemical recovery, steam is generated in a 400,000 lbs. of steam per hour bark burning boiler supplying steam at 875 psi and 900° F. The boiler is designed to burn gas, oil and coal in addition to bark.

Bark is fed into the boiler through five stocker feeders which receive a well proportioned suply of bark through separate chutes from the fuel proportioner powered by a variable speed drive motor. The chutes are equipped with balanced type dampers that have visual type indicators. Bark is uniformly distributed into the chutes by a rotating distributor mounted on a vertical shaft and operating at a uniform rate of 10 rpm.

Ash from the traveling grate of the spreader stocker unit is discharged into a refractory lined, steel plate ash hopper where it is temporarily stored for periodic hy-

Continued on page 174

PULPING AROUND THE WORLD*

F. T. PETERSON
President
The Black-Clawson Co.

TODAY'S economic renaissance throughout the world demonstrates more and more that nations must rely on indigenous raw materials for the production of finished goods in order to achieve and maintain economic selfsufficiency.

Moreover, the phenomenon we label with the over-worked phrase "population explosion", coupled with the profound need in many countries for better living standards, provides irresistible impetus for the development of the pulp and paper industry throughout the world.

What is the role of pulp and paper in this economic and sociological renaissance? Today, world population is 2,950,000,000. In 15 years it will reach 3,800,000,000. The most recent study of world per capita paper consumption by the Export Committee of APPA indicates that the present average per person is 50 lbs. per year. Since 1954 the growth has been at the rate of 1 lb. per year and this rate is expected to accelerate with the spread of culture and industrialization to the many underdeveloped areas of the earth. When we multiply the increasing rate of per capita consumption by the predicted growth in population, we reach a demand figure for world pulp and paper production which staggers the imagination.

The pendulum of history swings from the production of the first papers from mulberry and papyrus to the use, in more recent decades, of wood fiber as the predominant raw material, and now, on the backswing, to the resurgence of the use of agricultural fibers. One of the earliest sources of paper fiber was bamboo. Today, bamboo is once again a leading raw material for the papermaking industry of India and other east Asian countries. Several varieties of bamboo are also being employed in Latin America.

Raw materials supply in North America

In a brief round-the-world survey of raw materials for the industry, let us first take North America, or more accurately, Canada and the United States. We have three prime raw materials which will be the main stay of our pulping in the foreseeable future. These are softwoods, hardwoods and waste paper. Waste paper, of course, is the continuing offspring of the prime sources.

Inasmuch as wood shall remain our prime and predominant source of raw material, we can predict the U. S. and Canadian research in pulping processes will be mainly directed to improved methods of utilizing this traditional source of supply.

Pulpwood consumpton statistics as compiled by the U. S. Bureau of Census emphasize the growing importance of hardwoods. In the period 1952-59, while annual softwood consumption in the North Central region dropped from 2.0 million cords to 1.8 million, hardwood consumption rose from 0.9 million to 2.0 million, overcoming the softwood loss and adding a million cords to the total consumption. Although not as pronounced, the trend is the same in the Northeastern States.

Hardwoods have played an equally important role in the rapid growth of pulping in general in the Southern States. The South now produces more than half of all the hardwood in the U. S. industry.

Research is further contributing to an optimistic outlook for the North American wood supply for the next 25 years and beyond with the advancing sciences of forest management and wood genetics. Intelligent regulation of cutting and reforestation of available woodlands and growing enlightenment on the need to open and properly manage restricted woodlands will do much to increase our supplies. At the same time, the wood geneticists are predicting acceleration of the growth rate for traditional species and even selective breeding of modified varieties which will be grown for specific types of pulp needed for special paper characteristics.

Waste paper utilization

The long range outlook guarantees increased utilization of waste papers, as the inevitable expansion and consumption of paper production overtakes the supply of primary fibers. It is a rule of thumb that for every 4 lbs. of virgin fiber produced, there will be an increase of 1 lb. in the supply of available waste paper. This barometer indicates that in the next 15 years the repulping and reuse of waste paper in the United States will increase another 10,000,000 tons annually. The present 9,000,000 tons annual consumption is not a figure to treat lightly.

The problems inherent in the reuse of waste paper are three-fold:

1. The cleaning or removal of entrained dirt.
2. The removal of ink and printing materials.
3. The removal of dispersion of additives such as plastics and asphalt, etc.

Pulping developments

In the broad sense, the pulping processes we have employed in recent decades can be classified as sulfite, kraft, semi-chemical, and groundwood. However, with the industry's increasing emphasis on research and development, these basic processes have come under critical study, and numerous improvements have been made.

1. *Modified Sulfite Processes* — The traditional calcium base acid sulfite process has undergone important modifications through the application of magnesium, ammonium, or sodium base recovery to the standard system. With the use of magnesium bi-sulfite, ammonium bi-sulfite, or sodium bi-sulfite for digestion, the cooking liquor differs from conventional sulfite in its freedom from excess sulfurous acid and thus from excess sulfur dioxide vapor pressure. With the elimination of SO_2 many advantages occur: During operation, pulp can be cooked faster at higher temperatures with greater control of yield and strength at lower operational costs. The system also eliminates problems of stream and air pollution through chemical recovery, is adaptable to a variety of hard and soft wood species, either single or mixed, permits semi-chemical or full chemical operation with a single recovery system, gives

*Condensed from a paper presented at the Symposia, Fiftieth Anniversary Celebration, State University College of Forestry at Syracuse University, April 13, 1961.

higher yield and greater fiber strength than the normal acid sulfite process, and allows production of high brightness, unbleached and easily bleached pulps.

2. *High-Yield Sulfite* — Several mills have worked out a high yield type cooking based on the traditional acid sulfite process. This is accomplished through shorter cooking times with resulting higher hemi-cellulose and lignin in the cooked pulp. The higher yield is remarkable, although the resultant pulp has the inherent disadvantage of lower tests in several physical properties, the most predominant of which are tearing strength and opacity.

3. *High-Yield Kraft* — The same type of accelerated cooking has been applied to the standard kraft process with even greater success than with high yield sulfite. Considerable tonnages of high yield kraft are being produced in the liner board mills of the southern United States with yields up to 65 per cent. Strength development in these pulps, which naturally contain more lignin than fully cooked pulps, is obtained in the refining stage.

In the newer systems being installed other advantages have manifested themselves. For example, by refining immediately after the blow tank and screening before the washers, a more finely dispersed stock is presented to the washer, lending itself to better washing. Equally important is the elimination of the foam problem through pressure refining and screening. This system has the advantage of not having to dilute the stock after the washers for further screening requiring the use of post washing thickening apparatus.

4. *Neutral Sulfite Semi-Chemical* — Although the neutral sulfite process is not new, it is the youngest of our general group and has shown spectacular growth in the last twenty years. Much of the research in this field has been directed to continuous rather than batch processing with the result of a highly dependable low cost system which is extremely well adapted to and has been pointed mainly towards the utilization of hardwood species either singly or in mixtures.

Among its many advantages are: high yield, relatively high brightness in unbleached pulp, bleached pulp strength comparable to softwood sulfite, a high stiffness characteristic making these pulps valuable for corrugating medium, relatively low power requirement for strength development making the pulps adaptable to greaseproof and glassine papers, and relatively lower capital costs than for full chemical pulping, which permits construction of smaller plants on an economical basis.

5. *Cold Soda Pulping* — Since the introduction of modern cold caustic pulping by the U. S. Forest Products Laboratory only a little more than ten years ago, it has come forward as an extremely versatile, high yield system which promises a rapid growth — equal perhaps to that of semi-chemical. It has recently gained impetus with the introduction of several systems for continuous operation which drastically reduce the time required for impregnation of the chips with the sodium hydoxide cooking solution. As in the semi-chemical systems, fiberizing of cold soda chips is accomplished mechanically in disc refiners.

Hardwood cold soda pulps are exceptionally suited to the production of newsprint and groundwood printing papers, as a substitute for softwood-groundwood. In one continuous cold soda pulp system, recently introduced, the cold soda pulp can be produced at considerable lower horsepower demand than the equivalent tonnage of groundwood. When blended with standard groundwood in a newsprint furnish, the presence of cold soda also permits some reduction in the full chemical fiber required.

Cold soda pulps are proving their versatility as furnish in a side variety of other grades of papers and boards, notably foodboard, corrugating medium, tissue grades and structural boards.

6. *Chemigroundwood Process* — This system utilizes 4 ft. logs which are dropped into a large pressure vessel where a mild sodium sulfite solution is forced into wood at 150 lbs. hydrostatic pressure, effecting a mild pulping action.

Grinding horsepower is reduced, the yield and strength of the fiber are increased, and a pulp with a high drainage rate results.

Pulping outside of North America

In Scandinavia — Norway, Sweden, Finland — and in the Soviet Union, the preponderance of northern wood species makes it inevitable that progress in pulping follow much the same line as in North America. This is also true of Australia, New Zealand, Latin America, and many other countries where wood is the major source of fiber.

In round figures, let me present for a sampling of these woodpulp producing nations, their existing capacities, per cent of increase through currently planned expansion, and estimated productivity by 1965 or earlier:

	Current Pulping Capacity (short tons)	Planned % Increase	Est. Prod. by 1965
Sweden	4,800,000	48%	7,100,000
Finland	3,500,000	49%	5,300,000
USSR	3,300,000	118%	7,200,000
Brazil	400,000	115%	860,000
Mexico	170,000	124%	380,000
Japan	2,700,000	74%	4,700,000
Australia/New Zealand	520,000	73%	900,000
	15,390,000	72%	26,440,000

Other primary fibers

Although 85 per cent of the present world tonnage of paper is produced from wood fibers, other fiber sources have long since proved themselves acceptable as raw materials.

Straw pulping

Around the world, straw pulping — wheat, rice or rye — promises to grow in importance even though the unfavorable economics of its procurement and storage has diminished its importance in North America. It is an established raw material in Holland, Denmark, East Germany, Hungary, Rumania, USSR, England, Argentina, Mexico, Japan and Korea, and forms one basis of planning for the nascent industries of Egypt, Indonesia, South Africa.

In early work carried on at the U. S. Government Research Laboratory in Peoria, Illinois, atmospheric cooking of straw under violent mechanical agitation in the well known Hydrapulper resulted in what is known as the Mechano-Chemical process. This has proved

Continued on page 172

Potlatch Forest installs IBM process control on paper machine

IBM's Clark Lindsey briefs V. V. Vallandigham, Vice President, and P. T. Keller, Production Manager on process control system.

POTLATCH FORESTS INC., and International Business Machines Corporation have joined forces for an early September effort to apply computer controls to one of man's oldest and most temperamental manufacturing processes — paper making.

Company spokesmen stated they would unite a specially tailored IBM 1710 process control unit — first of its kind in the paper industry — with one of two machines at the main Potlatch plant in Lewiston. Each 500-foot-long machine is currently producing 250 tons of specialized paper board per day. The 1710 is expected to provide close tolerance quality controls presently unobtainable in the complicated process which converts great quantities of wood pulp into finished paper products at extremely high speeds.

The IBM 1710 is composed of the new 1711 data converter which translates instrument readings into language understood by a computer, and the solid-state 1620 data processing system. The 1710 records, stores, analyzes and reports these converted data in visual form to specialists and technicians who control the process.

V. V. Vallandigham, Potlatch vice president for pulp, paper, and converting said, "This new equipment will permit us to monitor our specialized paper processes at hundreds of points within the machine on an instantaneous basis. We can then make necessary changes immediately, the need for many of which formerly was found only at the regular routine thirty-minute test intervals."

First units of the equipment will arrive in Lewiston from the IBM plant at San Jose, California, during the first week of August, with the balance to follow a month later. The installation should be completed during the first two weeks of September.

Application of the process control equipment will give Potlatch another first in the paper industry following its earlier development of full-width air knife coating, use of 100 per cent bleached sulfate pulp to produce bond writing paper, and a system for passing effluent gasses through chlorine wash water for odor abatement.

An air conditioned room, to house the IBM 1710, will be constructed adjacent to machine No. 1. It is anticipated that the 1710 will be tied into the machine at more than 200 points along the process line and produce information for the operators on a scheduled basis. This schedule can vary according to the operator's needs and the demands of the current grade run. The 1710 reports to the operator in high-speed typing, pin-pointing trouble spots in red. The operator then makes the necessary changes after evaluating the information he has received in the light of his own experience.

Expected advantages

Potlatch Forests expects to realize many advantages from the project aside from the fact that the 1710 will collect large amounts of data for future use and application. Some of these advantages are as follows:

1. The 1710 should reduce grade change time by permitting the operator to regulate specification more quickly from raw fiber to finished paperboard.

2. The same information, in the hands of the operator on an instantaneous basis, should permit him to sharply reduce the quantity of off-grade runs.

3. The 1710, through its constant production of visible record virtually from within the heart of the machine, will act as something akin to an information retrieval system, providing a complete record of past success or past failure. The first can be duplicated on command by quick reference to the records and the second can be avoided when the operator sees the same set of circumstances arising once again. In the latter case, the 1710 will recommend proper corrective settings.

4. For the first time, management will have access to a complete and detailed record of a day's production. Such monitoring of operations on a nearly real-time basis will permit a high degree of what is popularly termed, "management by exception."

5. Potlatch Forests is hopeful the 1710 will permit the operator to closely relate refining tolerance to drainage rates and achieve a better and more uniform distribution of fibers.

6. Machine production speeds can be maximized.

7. Moisture content can be controlled closely. Aside from its obvious competitive advantages such control should reduce breaks, and assure more continuous production from one end of the machine to the other.

FACTORS TO CONSIDER WHEN SELECTING AN UNWIND STAND

HUGH K. SCHILLING

President
Horton Mfg. Co. Inc.

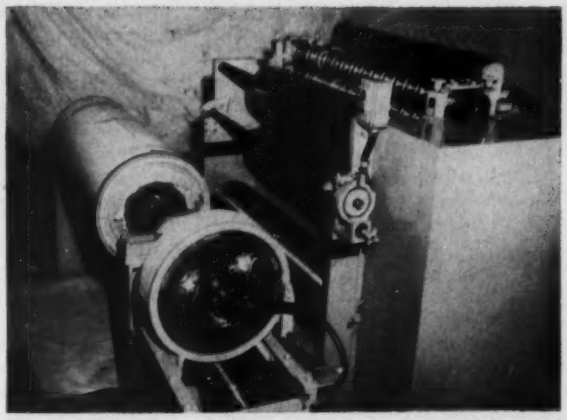


Fig. 1. Unwind stand equipped with specially designed air-cooled tension control brake.

FREQUENTLY mill superintendents and engineers come to members of our firm for an unbiased opinion as to what type of stand we think works best in various other installations we see around the nation. Although the question is a natural one to ask us, since we make equipment for tension control, we feel there is no single answer. It is possible, though, to limit the number of possibilities according to the job or installation in question, and thus reduce your "buying time" and possible margin of error.

When you are merely dealing with the dry end of a paper machine, the selection is as simple as it is limited: the requirement calls for (1) either a fixed installation such as a two-bar upright reel, or (2) a backstand with removable reel cores. It is when your problem lies deeper in the converting process that the question becomes more complex. Roll size, weight, machine speed, space, costs, production requirements — these are some of the major variables to be considered.

The unwind stand

First, let us define the term "unwind stand" as any device used to hold a roll of paper or other material while it is being unwound.

An integral part of such a stand is the tension control brake. A means of aligning the roll with the machine is also very often a part of the system. There are many tension control brakes available — "home-made", modifications of standard machine-stopping brakes, as well as those designed specifically for this one application. Figs. 1 and 2 illustrate two of the later types, the air-cooled and the water-cooled brakes respectively.

Both have governor control feature which automatically reduces torque output of the unit as the roll size decreases, giving uniform tension with an occasional manual adjustment to the brake.

When absolute tension control is required, an automatic tension head and control panel, are connected to the brake. With this method, the ultimate in tension control accuracy can be achieved. Given this selection to choose from, when do you use each? If you are using primarily one-width roll, a regular shaft-type stand is satisfactory.

Three basic types

There are three basic types of unwind stands: (1) shaft type, (2) shaftless, and (3) the driven type.

The "shaft type" utilizes a core shaft mounted on bearings. The "shaftless type" grips the roll center with chucks. The "driven type", driven on its surface by an outside source, is used mostly for light weight materials such as films, tissues, etc.

As we all know, there are variations to all three basic types depending upon the application; but, since the first two are by far the most commonly used, these are the ones we will concentrate on in this discussion.

When you analyze the function of unwind stands, you note that one of this piece of equipment's primary functions is to provide tension con-

Fig. 2. View of water-cooled brake.

Fig. 3. View of shaftless-type unwind stand.

trol. One of the most important features of an unwind stand is the brake it uses to control tension. No matter what features are incorporated in the stand, without proper tension control it is not doing the job for which it was intended.

If the width of the rolls running through your process varies, use the shaftless type unwind stand shown in Fig. 3. It will reduce center-whipping that occurs when attempting to run a variety of width rolls on a shaft-type unwind stand.

Why is the shaftless type preferred when the process employs a wide variety of roll widths? With the shaftless type stand you always have the same fixed distance between the edge of the roll and the bearing support. On the shaft type, this distance will vary, depending upon roll width.

Therefore, the shaftless type gives more rigid support to the roll and, frequently, a saving in labor required to load the stand.

Costs, of course, will play an important part in your considerations. May we suggest that you make certain, though, that your financial outlook does not completely dominate your thinking. While a shaftless stand costs more than a shaft-type, sometimes it can save production time and material cost in the right factory appplication. An automatic tension head and control panel have a specific basic cost. But, if such control equipment is needed for the job you intend to do — but is not provided — the cost in waste material and poor end product quality can run very high.

PULPING

Continued from page 169

quite successful and the first large commercial installation was made at the Union Paper Mills in Holland. Straw is introduced into a Hydrapulper at 15 per cent consistency and cooked under agitation for approximately 40 minutes to one hour with a 10 per cent solution of sodium hydroxide. Cooking temperatures of about 190° to 205° F are utilized.

The process produces an extremely high yield (70 to 80 per cent), remarkably strong, unbleached pulp with an extremely high pentosan contest.

From the Hydrapulper the lightly cooked straw is introduced directly to a high speed refiner where the chemically softened fibers are subjected to intense mechanical attrition to break up the nodes and straw bundles. The pulp, due to high inherent bursting strength and stiffness, has proved very remarkable in the production of corrugating medium. It is also very good for straw boards, used extensively in Holland.

Straw pulp produced in a batch process is quite easily bleached, and there is now some experience in Holland using continuous pulping with the Pandia digester to produce bleachable pulps efficiently at yields of 45 to 50 per cent. The trend in all new straw mills in Holland or elsewhere is toward continuous operation.

Bagasse pulping

The world potential for bagasse pulp is large because of its availability in suitable quantities in so many different geographic areas. The West Indies, Mexico, Central America, and most countries of South America grow sugar cane in abundance. It is a common commodity in Egypt and South Africa, in most of the countries of Southeast Asia, in the Philippines and Hawaii, and even in the Southern United States where two mills now utilize bagasse for bleached fine paper and building board production. A third mill for molded pulp products is now projected.

The world count of bagasse based mills in operation or in advanced stages of construction is high:

1. Cuba — Three mills, making newsprint, unbleached papers, and bleached papers: total rated capacity 240 tons per day.
2. Peru — Two mills, making bleached and unbleached papers and cement bag paper; total capacity, 200 tons.
3. Puerto Rico — One mill, producing 120 tons per day of paperboard and bag and wrapping papers.
4. Brazil — Three mills making writing and printing grades, corrugating medium and market pulp; total capacity, 135 tons per day.
5. Columbia — Two mills for bleached papers and corrugating medium; total capacity, 105 tons per day.
6. India — Five mills making newsprint and wide range of papers in which the bagasse pulp is frequently blended with bamboo pulp; total capacity, 350 tons per day.
7. Philippines — Two mills for bleached papers; total of 85 tons per day.
8. Argentina — Two mills for coarse papers and bleached fine papers; total capacity, 120 tons.
9. Mexico — Three mills for tissue grades and bleached market pulp; total capacity, 140 tons.
10. South Africa — One 40 ton mill producing corrugating medium.
11. Taiwan — One 80 ton market pulp mill furnishing 45 per cent of the total pulp consumed in Taiwan in a wide variety of papers.
12. Egypt — One 60 ton mill under construction to supply unbleached pulp.
13. Venezuela — One 60 ton mill under construction to integrate with paper mill producing wrapping, bag, linerboard, and corrugating medium.

In total, these operations add up to slightly more than 2,000 tons per day. Nevertheless, they demonstrate the trend which pulping development will follow at an accelerating rate in the newly developing economies of many countries.

Bamboo pulping

Botanically a perennial grass, bamboo has become a major source of fiber in India, China, Japan, the Philippines, and other southeast Asia areas. Although dry bamboo chips are extremely dense and difficult to penetrate, they respond successfully to modern pulping methods, including the continuous processes, and yield a fiber with high tear resistance and moderate bursting strength.

Especially in India, bamboo pulps are frequently blended with bagasse pulps to give a well-balanced pulp suitable for use in a wide range of furnishes.

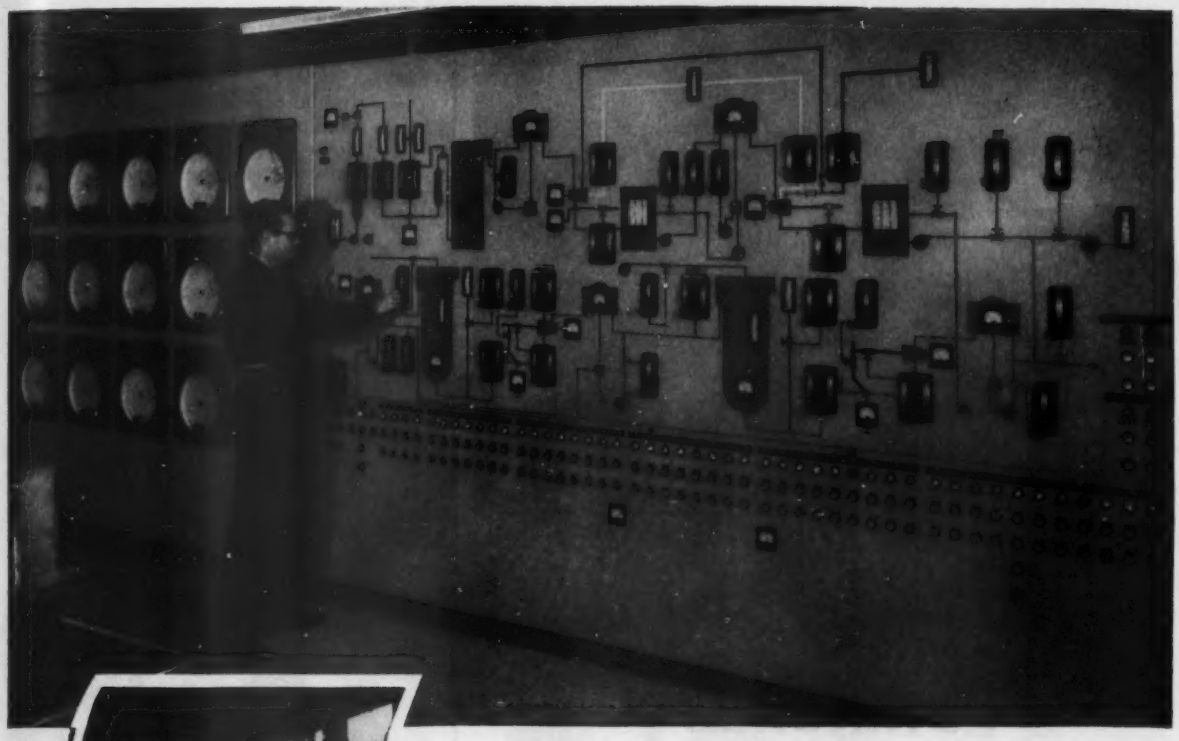
Some pulping experts have suggested that bamboo may some day be widely cultivated as a fiber crop.

Esparto pulping

Extensive investigations of rapid continuous pulping of esparto have put the economics of esparto pulping into a more promising picture. On the basis of demonstration pulping in our pilot pulp mill in Berlin, N. H., a 90 ton per day mill is now under construction in Tunisia to produce bleached esparto pulp for world markets.

Reeds

The delta regions of the Danube and Volga Rivers in southeastern Europe produce reeds that are being pulped successfully after much research, especially in finding efficient mechanical means for harvesting them. It is estimated that in the Soviet Union alone, 25 million tons of reeds are available annually. Four mills with a total output of over 800 tons per day are under construction to produce reed pulp in these regions.



Photos courtesy Marathon Southern Corporation

Bailey controls Marathon's five-stage bleach plant!

Marathon Southern's five-stage bleach plant at Naheola, Ala., is one of the most completely instrumented in southern U.S.A.

Rigid quality control—automatic and foolproof—keeps production going at top speed with unvarying excellence in the finished product.

The panel board in the central control room (above) was built and instrumented by Bailey. Note how it is divided into two sections. The 15 Bailey Recorders in the recorder section provide continuous circular chart records. The functional graphic panel on its right provides a complete visual picture of the entire process. Important control variables such as stock consistency, stock flow, bleach liquor flows, stock temperatures, etc., can be watched and instantly corrected, either automatically or manually.

At the same station, the operator can supply consistency-controlled stock (from any of four storage towers) to any of the semi-bleach, pine bleach, or gum bleach pulp chests on a ratioed flow, automatically controlled basis.

Each of the five vat bleach washers is equipped with automatic level control (as shown at left).

This is but one example of how Bailey is helping pulp and paper processors to greater degrees of automation, efficiency, and quality control. Let your Bailey Engineer suggest applications to fit your operation. Or write for specific control systems information for your entire plant operation. P149-1

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CONTINENTAL CAN

Continued from page 167

draulic removal by a Hydraseal ash handling pump, driven by a 30 hp motor, to an overhead dewatering storage bin. The capacity of this system is 15 tons of ash per hour.

The power plant also houses a 25,000/32,000-KW steam turbine generator capable of extracting steam at 180 psi and 80 psi as well as condensing unextracted steam. The turbine is equipped with an oil-relay governor which adds to its exceptional performance.

Steam turbines are used on boiler feed pumps and induced draft fans. These are connected to the same steam system as the power generating turbine, which adds to the simplicity of the power plant design.

Water treatment

Water from the Savannah River enters a 4,000 ft. long canal which terminates in a raw water pump station. Here it passes through a bar rake, then through a shut-off valve and traveling water screen into the raw water pump sump. The traveling water screen is a Model No 45A screen with 10 ft. wide tray and 36 ft. shaft centers. Its capacity is 26,100 gpm at 2 ft. per second and a low water level of 6 ft.

Three 9,000 gpm vertical pumps are installed in the water sump to pump water through a 36 in. steel main to the filter plant. Here water passes through a Venturi tube to a raw water mixing chamber and then to two 105 ft. dia., 20 ft. high Reactivitators, where it is treated with chlorine and lime. The sludge is separated in the clarifiers and the water passes to 12 sand filters which are 40 ft. long by 13 ft. wide. The filtered water is collected in a clear well of 200,000 gal. capacity.

Three 8,000 gpm pumps pump water from the clear well to the 3,000,000 gal. reservoir. Another set of three 8,000 gpm pumps supply water from the reservoir to the mill through a 36 in. cast iron main about 4,500 ft. long.

Waste water from the mill is passed through a 150 ft. dia. Rota-Rake clarifier featuring sloped side walls and a drive mechanism that can operate under conditions of torque as high as 400,000 ft. lbs. The unit, to save several thousand dollars, is not provided with a bridge for access to the centrally located drive mechanism which instead is reached by rowboat. A remote torque indicator alarm indicates the load on the scraper-thickener mechanism.

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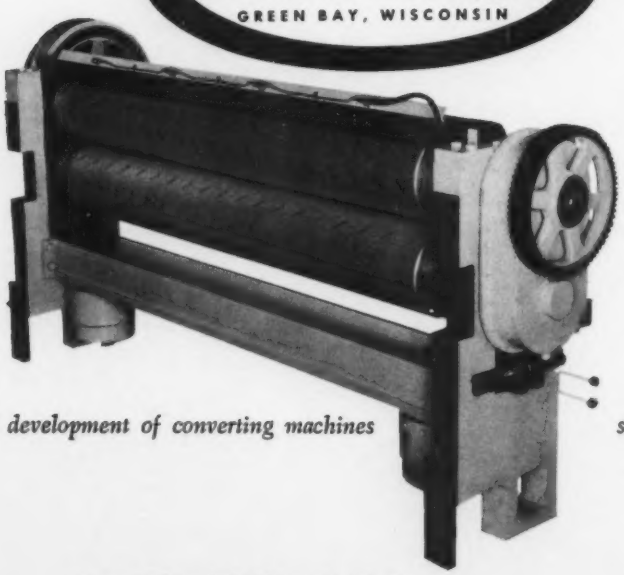

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Warren B. Bullock

Business conditions not so dark — Tariff-cutting talks expected soon

Conditions are improving

With the depression apparently tapering off, executives of paper manufacturing companies have told stockholders in annual meetings and in their annual reports that the prospects for the balance of 1961 are improving, despite a discouraging first quarter record of lower earnings as compared with 1960. The paper industry is looking upward as general business conditions improve — this was the encouraging note in these reports. Attention is also called to the fact that in the first quarter of 1960 there was little sign of the recession which followed later in that year, and therefore a comparison between the initial quarters of 1960 and 1961 is not quite as dark as it might seem.

At the annual meeting of St. Regis stockholders, President William R. Adams stated that earnings and orders began to rise in March. William H. Walters, president of Diamond National, told his stockholders: "I think we're over the hill as far as this adjustment period is concerned". H. E. Whittaker, chairman of the board of Mead Corp. and president of the American Pulp & Paper Association, indicated a marked improvement in the six weeks ended in mid-March. John H. Riegel, chairman of Riegel Paper Corp., told stockholders he expected improvement in the balance of 1961.

R. O. Hunt, president of Crown Zellerbach Corp., in a quarterly report to stockholders said conditions indicate improvement in the three months to come. Robert Faegre, president of Minnesota & Ontario Paper Co., told his company's stockholders: "The company has had hard sledding in the last six months", but added that the low point was apparently reached in February, with conditions continuing to improve through March. Alexander Calder Jr., president of Union Bag-Camp Corp., said incoming orders are picking up, and the same trend was reported by John R. Kennedy, president of Federal Paper Board Co., who added that a better flow of business began in March with indications that a healthier climate for the board business can be expected.

John H. Hinman, chairman of the board of International Paper Co., said that the industry may expect some improvement during the balance of the year despite an unfavorable first quarter, but that there still might be a reflection in earnings reports of the substantial overcapacity in the industry. Mr. Hinman is retiring to become honorary chairman. In addition to becoming honorary chairman, he was named director of woodlands. Richard C. Doane, president, was advanced to the chairmanship, and Lamar M. Fearing, son of a former vice-president, was advanced from executive vice-president to president.

An official association survey of 83 companies shows an increase in sales, measured in dollars, of 5.4 per cent in 1960 over 1959, while net income for the same companies was down 5.3 per cent.

Another slant on how paper company officials have regarded their own industry is a comparison of purchases and sales of their own companies' securities. Based on reports to the Securities and Exchange Commission during the period from January 11 through March 10, paper company officials purchased $780,790 worth of such securities, while their sales totaled $2,179,388.

Sharp rise in C-T stock

One of the sensations of Wall Street trading in recent weeks has been the startling rise in quotations for stock of Certain-Teed Products Corp., which has tripled in value between January and early May. The spurt is due to the success of the company in devising and selling "shell" homes, a program under which a house is delivered to a buyer with only a finished exterior, the financing being arranged through a nationally known financing corporation. The rapid rise in the stock is squeezing the "bears" in Wall Street who thought to profit by selling shares which they do not own and must borrow to meet their commitments. The company has slightly less than two million shares outstanding and the short interest has been well over 80,000 shares, at times as high as 89,000. This short interest is computed to be 10 per cent of the floating supply. The success of the shell home idea is attracting the attention of other manufacturers of building boards. Certain-Teed stock, valued at $11 in 1960, was up to $20 in January and short covering in a single day boosted the value $4 per share. Recent sales have been in the neighborhood of $60.

Tariff-cutting talks

International tariff-cutting negotiations are expected to get underway soon, as the President's authority to reduce tariff rates expires next year. These negotiations will consume several months, and have been delayed while the European common market nations have been trying to get their operations adjusted.

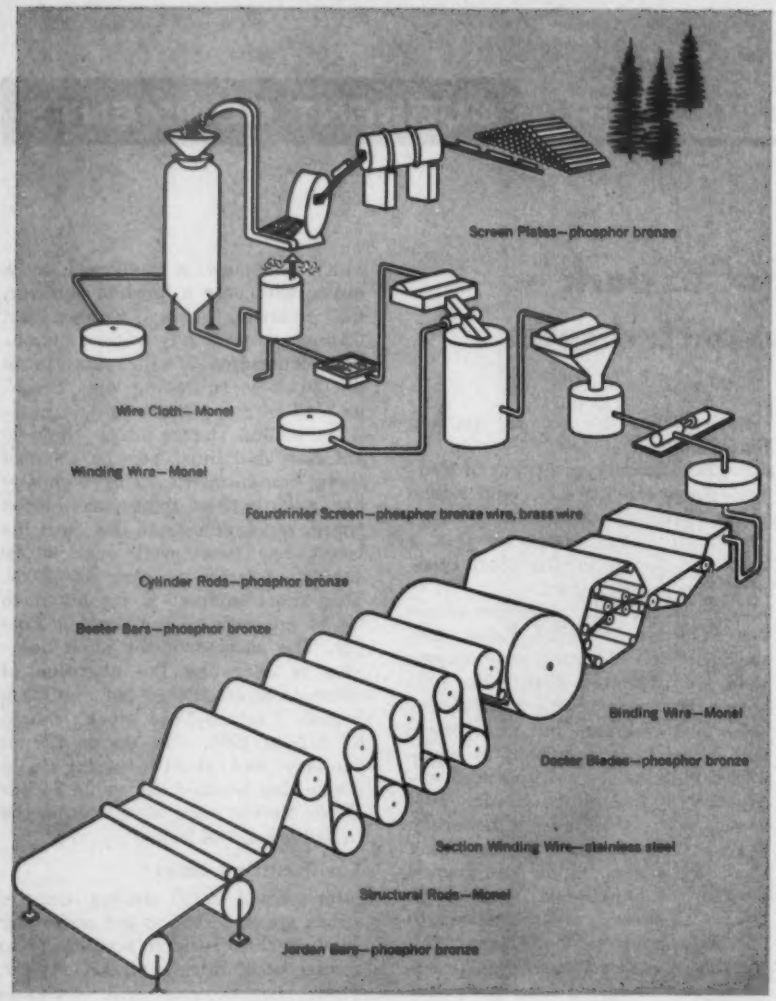
One delay in the GATT conferences for reducing rates has been the refusal of the European Economic Community to make any advance concessions. The Administration at Washington now is said to feel that sufficient progress has been made to risk opening the tariff-cutting talks which were originally scheduled to begin last January.

Net incomes

Allied Paper Corp.—Net income in 1960 fell to $403,539 from the 1959 profits of $1,854,325, although sales climbed to $46,925,175 from the previous year's $38,718.555.

West Virginia Pulp & Paper Co.—Total income for four months ending February 28, $77,494,000; a year ago $79,000,000.

Brown Co.—Income for year ending November 30, $1,347,468; a year ago, $4,135,989.



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CURRENT COMMENTS

Continued from page 177

Minnesota & Ontario Paper Co.—Net earning in 1960, $5,833,334; a year ago, $5,924,497.

International, Paper Co.—Net income for 1960 was $71,648,000; a year ago $83,610,000. Lower income was due to lower prices for pulp, some grades of paper and converted products, but a year of intense competition ahead the low point of the industry for the current period has been reached.

Financial notes

Stock Exchange price for paper industry issues were generally lower in the month ended May 10, with preferred issues more favored as compared with the common stocks.

Stock and Bond Quotations

New York Stock Exchange

Closing Prices	May 10, 1961	April 10, 1961
American Can	40⅜	42⅜
Same Pref.	37¾	39⅜
Celotex	28⅝	28⅞
Same Pref.	18⅝	* 18½-19
Champion P & F Co.	57¾	42⅜
Certain-Teed	30⅜	33⅛
Same Pref.	* 91½-92½	* 91-92
Chesapeake of Va.	37¾	37¼
Container	28⅜	26⅛
Same Pref.	* 83-84	* 93⅛-94½
Crown Zellerbach	58¾	56½
Same Pref.	92⅛	92
Diamond Nat'l.	45¾	44⅜
Same Pref.	* 31⅛-32	* 31¼-31¾
Federal Paperboard	36⅝	38½
Same Pref.	* 23-23⅛	* 23-23½
Fibre Paperboard	30	32¼
Great Northern	63	67¼
Hammermill	30¾	32
International	32¼	33
Same Pref	* 95¼-96	* 94¼-94¾
Kimberly-Clark	83½	88¾
KVP Sutherland	34	36¼
McAndrews & Forbes	32	28½
Masonite	31⅜	32
Mead Corp.	38½	39¾
Same Pref.	* 90½-92½	* 89½-91
Minn & Ont.	31½	32
Nat. Vulc. Fibre	24⅞	24½
Oxford Paper	3½	33¼
Same Pref.	94	92¾
Rayonier	20⅞	21¾
Riegel Paper	33⅞	28
St. Regis	35⅜	35¾
Same Pref.	97	* 97-100
Scott Paper	114	104¾
Same $4 Pref.	95	93¼
Same $3.40 Pref.	80¾	78½
Sealright	39½	36
Standard Packaging	30⅛	26⅜
Same $1.60 Pref.	* 70-79	* 75-81
Same $1.20 Pref.	30⅛	31¼
Same 6% Pref.	29¼	31¼
Union Bag-Camp	38½	37
United Bd & Cart	25½	27¾
U. S. Gypsum	98	106
Same Pref.	*154½-156	156
West Va. P & P	37⅜	38
Same Pref.	*100¼-101½	* 95⅜-97

New York Stock Exchange — Bonds

Champion P&F Co. 4½%	112¾	113½
Champion P&F Co. 3¾%	87	—
Diamond Gardner 4%	—	95½
Kimberly-Clark 3¾%	92⅛	92
Oxford 4¾%	116	114
Scott Paper 3%	145¾	134¾

American Stock Exchange — Stocks

Allied Paper	13¾	10⅜
American Writing	34	34½
Brown Co.	14¾	14⅞
Puget Sound	22¼	22⅞

*Closing Bid and Asked Prices

Rayonier Develops New Graft Cellulose

A NEW industrial raw material resulting from the highly uniform grafting of an organic compound to the cellulose polymer and representing a significant advance in cellulose chemistry has been developed by the Eastern Research Division of Rayonier Inc.

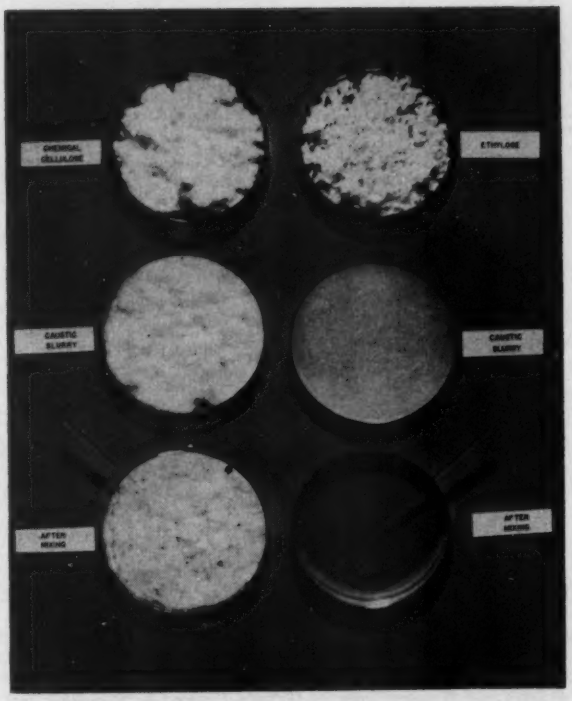
Trade-named "Ethylose," the new material, an outgrowth of the chemical cellulose producer's graft polymer program, is seen by company officials as only the first in a whole family of modified celluloses in which various chemicals and polymers are grafted onto a basic cellulose backbone.

The company is hopeful that the new material will broaden and further diversify the uses for cellulose, a readily available and easily replenishable low-cost chemical from trees. Potential markets of special interest include coated papers, textiles, paints, ceramics and foods. Rayonier Research said it foresees such immediate new products as textile sizes, binders and coatings.

Dr. R. L. Mitchell, general manager of research, explained that "Ethylose" is a high-quality, purified wood cellulose modified or grafted with a small amount of ethylene oxide to alter its behavior characteristics.

The material is insoluble in water. But it can readily be dissolved in aqueous alkali to render stable and useful solutions. It is also soluble in the common cellulosic solvents such as cuprammonium hydroxide, cupriethylene diamine, ammonium thiocyanate, sodium ferric tartrate, Cadoxen, etc. "Ethylose" swells slightly in quaternary ammonium compounds and is insoluble in nearly all organic solvents, as well as water.

The amount of substitution of ethylene oxide is only 4 per cent. "Ethylose" differs from vicose in that it is stable in the small pellet form in which it is prepared as well as in solution. It can be shipped for long distances or stored for long periods without deterioration and without the need and expense of handling large quantities of water and other solvents.



The left-hand column of petri dishes contains chemical cellulose subjected to sodium hydroxide as is the new graft cellulose, "Ethylose", in the right-hand series of dishes. The graft cellulose responds instantly to the caustic, forming a clear solution. However, the chemical cellulose fibers merely swell, remain static and unaltered under the identical influence of NaOH.

Application and regeneration

"Ethylose" solutions can be adjusted to proper solids-viscosity ranges for coating, tub sizing or surface spraying. "Ethylose" can be regenerated by alkali removal or heat followed by washing. The particular method selected will depend on the process and end-use requirements. Neutralization can be accomplished by acid-salt solutions such as 10 per cent H_2SO_4 and 15 per cent Na_2SO_4, or by acid alone. Acid-salt solutions of a dehydrating nature regenerate a product with higher density, lower gel swelling and best physical strength. Temperatures in the range of 40° to 60° C. are preferred.

Automated plant announced

The company has recently placed in operation a new plant at its Fernandina Beach, Florida, division for the manufacture of the new material. This plant is using a continuous, automated process employing new concepts in both reaction principles and in equipment designs.

Lodding Holds Doctoring Seminar

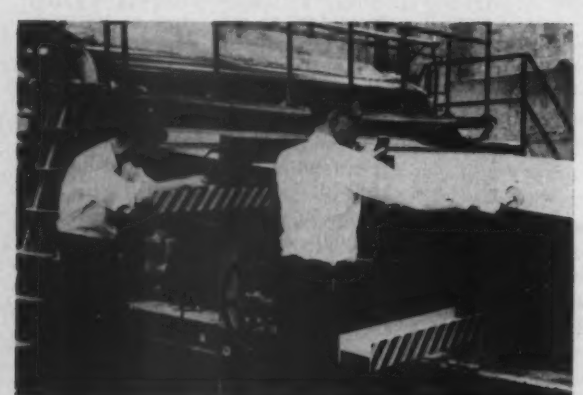
The first of a series of concentrated, one-day seminars on proper doctoring procedures was held recently at the Auburn, Mass., plant of Lodding Engineering Corp.

Under the direction of James K. Gardner, marketing manager and

Joseph S. Cooper, field service manager, the program was characterized by informal presentations, demonstration and periods of general discussion covering: good doctoring, detailed procedures for installing a doctor operation, and proper utiliterns as a means of determining doctor operation; and proper utilization and maintenance of hydraulic and mechanical oscilation and and pressure rigs.

A number of similar day-long seminars were held in mills on the West Coast during May. Other areas of the country will also be visited. The seminar was offered by Lodding as a service to help mill maintenance personnel gain a better understanding of the requirements for good doctoring. Mills interested in having their engineering and maintenance staffs participate in doctoring seminars are invited to make arrangements for doing so through their Lodding sales representatives.

Mill maintenance personnel attending the one-day doctoring seminar at Lodding Engineering Corp. Seated around table, from left to right, are: Alan Guild and Donald W. Lafreniere of Oxford Paper Co.; Clarence A. Baldwin, Donald A. Beebe, Maurice Roberts and Frank Koloski of Hurlburt Paper Co.; Harold Irish of Byron Weston Co.; Harold Elser, Isadore Plant and Edward Elser of Crane & Co.; and Warren Lutz of Oxford Paper Co. Standing, left to right, are: Joseph S. Cooper, field service manager and James K. Gardner, Lodding marketing manager, who jointly conducted the seminar.



Huyck Felt's Bill Welch, with Huyck's Beta Ray Gauge, and Don Baade, with Huyck's measuring wheel, are checking press water removal efficiency.

Huyck Felt Announces New Service

A PIONEERING effort in the relationship between manufacturers of papermaking felts and paper mills is being made by Huyck Felt Co. of Rensselaer, N.Y., in the establishing of a new type of service for the paper industry.

This service began when Huyck Felt placed qualified research and development personnel in the Portland, Ore., area, to serve paper mills as Resident Engineers on a continuing basis. The purpose of the program is to study the various phases of felt and press operation, the factors in influencing sheet finish, size, stability, water removal and the felt's ability to "couch" or pick up. Emphasis is also placed on the felt as a sheet conveyor and power transmission belt. The entire "Resident Engineer" field effort is supported by a team of scientists, engineers and highly qualified consultants working in Huyck's Science Center, located in the Rensselaer, N.Y., plant.

Not only will more fundamental information be uncovered about the function and mechanisms of water removal by papermakers' felts but advantages in the form of better water removal and improved paper quality are anticipated for the cooperating paper mills.

Huyck Felt has appointed J. William Welch as Senior Resident Engineer for the Oregon area. He will be assisted by Donald Baade who will be Junior Resident Engineer. This new research and development program will be offered as a supplement to the regular services now provided by Huyck's Regional Sales Manager — Roy W. Keller and Field Service Engineer, Robert D. Baer.

John W. Bolton & Sons Adds New Product Line

Influenced by pressure from customers, John W. Bolton & Sons Inc. of Lawrence, Mass., has added the production of doctor blades of all types to its industrial knife division.

Bolton doctor blades are now available in all sizes and types in the following materials: tempered carbon steel, cold-rolled steel, stainless steel, K-Monel steel, phosphor bronze, laminated plastic, special alloys and materials for special applications.

An illustrated bulletin (DB-61) on Bolton doctor blades is available on request to Machine Knife Division, John W. Bolton & Sons Inc., Lawrence, Mass.

Corporation changes

Kimberly-Clark Corp. of Neenah, Wis., has announced an agreement to acquire *Century Envelope Co.* Inc., a manufacturer of specialty envelopes in New York City. Kim-

Continued on page 182

*Idea submitted by William T. Hawkins, Jr., S.D. Warren Co., Muskegon, Mich.
Photo of Columbia River from "Crown Point," near Portland, Oregon.

HAM FELTZ says:

"Reminds me of the steady flow of water through HAMILTON Felts!"

"You get a faster, steadier water flow with specially designed, porosity-proven Hamilton Felts. And — Hamilton Felts *stay* open . . . *longer* . . . don't get filled up with white water particles. By removing more water at the wet end of your machine, Hamilton Felts save fuel and time at the driers. You benefit from the increased production, higher quality and greater profits that result.

"If one of our 300 modern, technically proven styles won't solve *your* needs, we'll be happy to design a Hamilton Felt that will. Just ask your Hamilton Felts Service Salesman."

YOU CAN'T BEAT

Hamilton

FELTS

*WIN . . . *A NEW Shakespeare Spincast Fishing Outfit!*

"What famous place reminds you of Hamilton Felts? Tell us why in a few words; sign your name and address and name of company. Each idea from a U.S. papermaker that we use wins a new 1961 model Shakespeare Spincast Rod and Reel—FREE! When identical winning ideas are submitted by 2 or more papermakers, the one with the earliest postmark will be considered the winner. Every U.S. papermaker *entrant* receives a famous Rex Spoon fishing lure — FREE. Send me your suggestion — today.

Ham Feltz, Dept. I
612 First National Bank Bldg., Cincinnati 2, Ohio."

SHULER & BENNINGHOFEN, HAMILTON, OHIO

For more data circle 122 on Post Card

Continued from page 180

berly-Clark has also announced the acquisition of all the business and assets of *Blake, Moffit & Towne*, a San Francisco paper distributor. This company will become a division of K-C as a distributor of industrial and printing paper in the Western states. Plans have also been announced for acquiring an eastern facility to manufacture nonwoven fabrics developed by Kimberly-Stevens Corp. (a jointly-owned subsidiary of Kimberly-Clark and *J. P. Stevens Co., Inc.* of New York). The idle *Robertson Bleachery* at New Milford, Conn., will be renovated as a manufacturing unit of Kimberly-Stevens.

Eaton Mfg. Co. of Cleveland, Ohio, has acquired substantially all the assets of the *Dill Mfg. Co.*, also of Cleveland. This move is a part of Eaton's continuing program of expansion and diversification which has seen the company broaden its base of markets and product lines during the past five years.

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Membrane Linings
Tile Structures

Design, Construction and Maintenance

STEBBINS ENGINEERING AND MANUFACTURING CO.

WATERTOWN, N. Y.

Pensacola, Seattle, Montreal, Vancouver

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Transfer of the assets of *Hamilton Paper Co.* of Miquon, Pa., to *Weyerhaeuser Co.*, Tacoma, Wash., has completed the merger of the two companies through an exchange of stock. Hamilton stockholders had approved the merger on the basis of 9-10 of Weyerhaeuser share for each share of Hamilton.

Shareowners of *Atlas Powder Co.* approved the company's proposed merger with *Stuart Co.*, a pharmaceutical manufacturer and distributor.

Central Paper Co. of Menasha, Wis., has purchased 100 per cent of the capital stock of the *Touchdown Corp.* of Chicago, Ill. Touchdown manufactures a complete line of pressure sensitive tapes and printers' stock which will be added to the current line of Central products.

J. M. Huber Corp. has acquired the assets of *International Clay Co.* of Graniteville, S.C. M. W. Huber, president of J. M. Huber, stated that this acquisition will add to Huber's resources of kaolin clay. International Clay Co.'s mine and properties adjoin Huber's largest mine in South Carolina.

Rapid-American Corp. has purchased all the outstanding stock of *Cellu-Craft Products Corp.* of New Hyde Park, N.Y.

Diamond Power Specialty Corp. of Lancaster, Ohio, has reported that it has purchased outright three companies located in Southampton, England, from Whitfield Industrial Developments Ltd. of London. The acquisitions comprise of: *Diamond Blower Co. Ltd.*, which sells boiler cleaning products; *Ferry-Diamond Engineering Co. Ltd.*, which manufactures boiler cleaning products; and *Fyrex Ltd.*, which makes and sells pumps, filtration plant and fire-fighting equipment. Commenting on the purchase, W. J. Fitzburgh, president of Diamond Power, said: "The full benefit of our products and our research and development programs will be extended to these concerns, enabling them to expand their markets to Europe and the British Commonwealth". Diamond Power is a subsidiary of *Babcock & Wilcox Co.*

Scott Paper Co. has announced that its wholly owned subsidiary, *Scott Overseas Corp.*, will invest $750,000 in a new Philippine paper corporation. The new corporation, called *Eastern-Scott Paper Co. Inc.* will be owned 50 per cent by Scott, with the remainder of the equity being held by Eastern Paper Mills Co., Ltd. which is a Philippine partnership. Eventually, products of the kind and quality manufactured by Scott in the United States will be produced by the new company and marketed under Scott trademarks.

Consolidated Paper Co. of Monroe, Mich. and *Crandon Paper Mills Inc.* of Fort Madison, Iowa, have jointly acquired the *First Carton Corp.* of Clinton, Miss., and the *First Packaging Corp.* of Yazoo City, Miss. These companies have been in operation for about a year. The two companies are being operated as jointly owned subsidiaries of Consolidated and Crandon.

Merger of *Industrial Rayon Corp.* into *Midland-Ross Corp.* has been approved by the shareholders of both companies. Terms of the merger agreement provide that each of the 1,851,255 common shares of Industrial Rayon stock will be converted into two-fifths of a share of Midland-Ross common stock, bringing the total number of Midland-Ross common shares outstanding to 1,422,527.

recent expansions

Potlatch Announces Production of New Paperboard

Potlatch Forests Inc. of Lewiston, Idaho, has begun production of a new-type high-barrier paperboard. Potlatch is said to be the first U.S. paper manufacturer to produce the high-barrier board in commercial quantities. The company has also announced plans for an early production of high-barrier papers as well.

The introduction of this new paperboard resulted in the successful application of an adequate barrier coating. A recent development of a new polyvinylidene chloride emulsion by the Dewey & Almy Chemical Division of W. R. Grace & Co. enabled the company to impart the high-barrier properties of saran-type plastics to paper and paperboard at modest cost.

Continued on page 183

Continued from page 182

The company said the new paperboard will provide the packaging industry with an economical material which has high resistance to moisture, grease, air, gases, odors and many acids, alkalies and solvents. Packages made of it will help to retain the original freshness, aroma and flavor of food products. Potlatch's initial production is expected to be converted to bakery boxes, meat trays, picnic plates and cups and similar items.

Inspecting the new high-barrier paperboard are, left to right: M. G. Kohluman, technical director; Vance V. Vallandigham, vice president for pulp and paper; and Donald T. Keller, production manager.

International Container Division in Northlake

International Paper's Container Division will start operations in October at a new 260,000-sq.-ft. plant at Northlake, Ill. The facilities will manufacture corrugated shiping containers and will be the largest International Paper operation of its type.

The new container plant will be equipped with corrugators and all other equipment necessary to convert kraft board into corrugated container. The plant will more than double the size of the existing facilities.

K-C Completes Major Expansion At Neenah

Kimberly-Clark Corp.'s Neenah Paper Division, Nennah, Wis., has completed a major expansion program with the start-up of a new paper machine which will produce a variety of fine writing papers and specialty sheets.

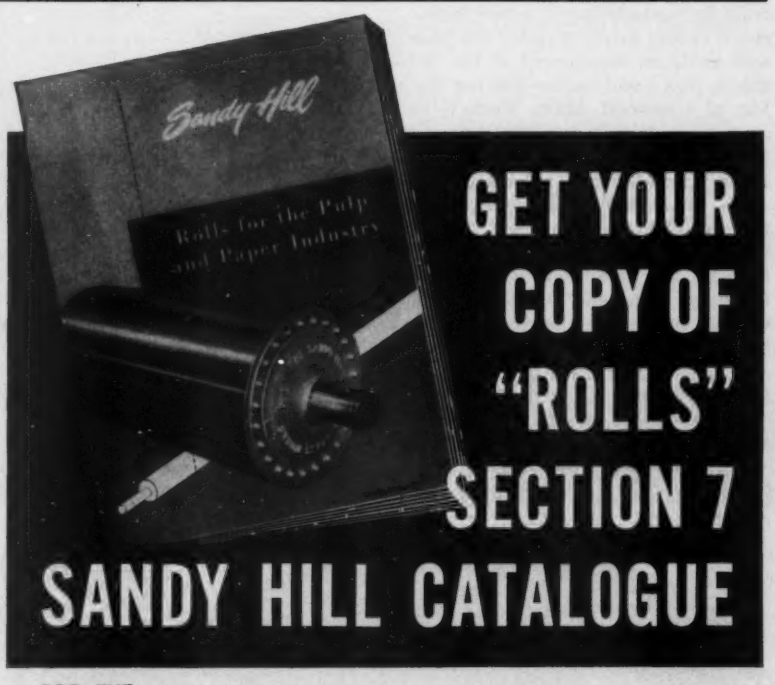
The new unit (a machine completely rebuilt since its original installation in 1921) was designed for a daily capacity of up to 35 tons, more than twice the capacity of its predecessor. It will increase the fine paper producing capacity of the Neenah Division by up to 50 per cent. It is capable of making a complete range of cotton content and mixed wood and cotton fiber grades, especially in the lighter weights.

Other items included in this latest expansion program was the expansion of the stock preparation system to increase the mill's capability of preparing any type of fiber to meet customer end-use requirements.

The modernization at Neenah is the first project to be completed in a multi-million-dollar program announced by Kimberly-Clark last year. This program was to expand and improve its printing and business papers production facilities. The corporation's mills in Kimberly and Niagara, Wis., and West Carrollton, Ohio, are also included in the program.

Strathmore to Rebuild No. 6 Machine

Strathmore Paper Co., West Springfield, Mass., has announced it will completely rebuild its No. 6 paper making machine in Woronoco late this summer. Recently completed at Woronoco was a new power plant which was built to handle the increased capacity of the new machine.



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FOR THE PAPER INDUSTRY SANDY HILL PRODUCES:

Breast Rolls
Table Rolls
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Blow Rolls
Couch Rolls
Cylinder Moulds
Distributor Rolls
Felt Carrier Rolls
Granite Rolls
Dryers
Yankees
Cooling Cylinders
Dryer Felt Rolls
Spring Rolls
Reel Drums
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Miscellaneous Rolls
Also Roll Grinding and Rolls for other industries.

At Sandy Hill every operation in the manufacture of a paper machine roll is in the hands of able and experienced engineers and mechanics. These designers and builders are backed by the company's hundred year history of service to the paper industry.

Each paper machine roll is designed for its particular function in the papermaking process, and manufacturing operations conform to the highest standards to assure rolls of the finest quality.

THE SANDY HILL IRON AND BRASS WORKS
HUDSON FALLS, N. Y.

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The No. 6 machine is being redesigned to make paper at a top speed of 750 ft. a min., compared with the present maximum of 500 ft. As part of the complex rebuilding operation, the wire length of the fourdrinier is being increased from 50 to 75 ft., and 13 new drying drums and a new machine sizing unit will be added. The new machine will be 60 ft. longer. The No. 6 machine produces bond, blueprint, tracing, diazo or white print, and photographic base papers.

Kimberly-Clark Adds Coated Printing Paper Machine

Kimberly-Clark Corp., Neenah, Wis., has awarded the general contract for installation of a new high-speed coated printing paper machine and auxiliary equipment at its Niagara, Wis., mill to the Cherne Co. Inc. of Ironwood, Mich. Work is to start immediately and the contract calls for late 1961 start-up of the 170-in. machine and related equipment. Construction of a 100,000-sq.-ft. mill addition is in progress and is expected to be complete by late spring. The addition will house finishing room and warehouse facilities.

Coming Events

TAPPI

June 19-30 — Tenth Statistics Course, jointly with CPPA, Queen's University, Kingston, Ontario.
June 20 — Fun Day (with PIMA), Gull Lake Country Club, Richland, Mich.
August 15-17 — 12th TAPPI Testing Conference, Montreal, Que.
September 6-8 — 11th TAPPI Corrugated Containers Conference, St. Francis Hotel, San Francisco, Calif.
September 19-21 — 4th International Mechanical Pulping Conference, Edgewater Beach Hotel, Chicago, Ill.
October 16-19 — 16th Engineering Conference, Shoreham Hotel, Washington, D.C.

PIMA

June 20 — Joint Meeting with TAPPI, Gull Lake Country Club, Gull Lake, Mich.
August 31-September 2 — Annual Meeting, New York-Canadian Division, Saranac Inn, Upper Saranac Lake, N.Y.
September 20-22 — Fall Meeting, Northwestern Division, Faust Hotel, Rockford, Ill.
September 21-24 — Northeastern Division, Poland Spring House, Poland, Maine.
October 5-7 — Connecticut Valley Division (joint meeting with TAPPI), Equinox House, Manchester, Vt.
October 11-13 — Southeastern & Southern Divisions (Annual Fall Joint Meeting), Jung Hotel, New Orleans, La.
October 12-14 — Pennsylvania-New Jersey-Delaware Division Fall Meeting, Claridge Hotel, Atlantic City, N.J.
October 19-21 — Miami Valley Division Annual Meeting, French Lick Sheraton, French Lick, Ind.
November 30-December 1 — Pacific Coast Division Fall Meeting, Olympic Hotel, Seattle, Wash.

OTHER MEETINGS

June 19-30 — Tenth Statistics Course, CPPA, Queen's University, Kingston, Ontario.
June 22-23 — Seventh Annual Conference on Electrical Engineering as applied to the Pulp and Paper Industry, Western Michigan University, Kalamazoo, Mich.
June 26-30 — 11th Annual Quality Control Conference for the Graphic Industries, Rochester Institute of Technology, Extended Services Division, Rochester, N.Y.
June 28-30 — Second Joint Automatic Control Conference, University of Colorado, Boulder, Colorado.
July 10-August 17 — Second Summer Institute for the Pulp and Paper Industry, University of Maine, Orono, Maine.
July 27-28 — Second Annual Great Lakes Forestry Exposition, Mio, Mich.
August 6-12 — 18th International Congress of Pure and Applied Chemistry, Montreal, Canada.

Replacement Screen Cylinders

to fit: SHARTLE - 24P Selectifier Screen

1. Completely interchangeable with your present screen plates.
2. Manufactured in all standard Shartle hole diameters and gauges of material.
3. Available in Type 316 Stainless Steel, Monel and Inconel.
4. Sold directly from the manufacturer through your Morey Paper Mill Supply sales representative.

Liberal discount by exchanging your old cylinders complete with rings.

Write for descriptive material. Dept. SP

NATIONAL PERFORATING CORP.
SUBSIDIARY OF FITCHBURG SCREEN PLATE CO.
301 SOUTH STREET, FITCHBURG, MASSACHUSETTS

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tear out this page

as a handy reference to a source for good gears

Whenever you want good gears . . . at the right price . . . and on schedule, call D. O. James. Complete facilities for producing:

Continuous-tooth herringbone — the gear with the backbone — up to 60″ diameter — 20 to 2 DP.

Worm gears — generated gear tooth, 1″ to 60″ diameter — 24 to 1 DP.

Helical gears — 1″ to 72″ diameter — 20 to 2 DP.

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Spiral bevel gears — 1″ to 30″ diameter — 24 to 1¾ DP.

Spur gears — ¾″ to 145″ diameter — 24 to ¾ DP.

Internal gears — straight-tooth up to 54″ ID, 60″ OD — 2 to 16 DP.

Machine cut racks — Our facilities for making machine cut racks are extensive — cutting in any length teeth from 24 to 1 DP.

Also flexible couplings — designed on simple, sound, and thoroughly tested mechanical principles to provide a flexibility that compensates for parallel and angular misalignment. Made in three styles — D. O. James flexible couplings, D. O. James universal couplings, and Sierbath gear-type. Ask for catalog 48-B.

D. O. JAMES GEAR MANUFACTURING CO.
1140 West Monroe Street, Chicago 7, Illinois
Since 1888, every type of gear and gear speed reducer.

D.O.James

...where you always get good gearing

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Final summary of 1960 safety scores

COMPETING mills in the 1960 National Safety Council contest for pulp and paper firms have reported an accident frequency rate of 1 per cent above that of 1959. Not included in this figure is the Pulpwood Logging Division, which showed a decrease of 9 per cent.

Out of 736 contestants that completed the contest, 113 contestants maintained perfect scores. A summary of the contest experience is shown in the table on this page.

The following is a list of the mills with the best records in each division — frequency rates are in parentheses. From the eligible mills in Division I, the board of judges will choose the mill with the most outstanding record. This plant will be awarded the grand prize — the Edward Benton Fritz Memorial Trophy — presented each year by The PAPER INDUSTRY.

SUMMARY OF CONTEST EXPERIENCE

Division	Average Man-Hours Monthly	Jan-Dec 1960 Frequency Rate	% Change From Jan-Dec 1959
All Divisions (except Div. III)	592,706,000	6.91	− 5
Division I — Pulp & Paper		6.31	− 5
Group A	170,000	4.93	+ 6
Group B	85,001 & 170,000	6.56	−11
Gorup C	42,501 & 85,000	7.92	−18
Group D	21,251 & 42,500	10.40	+ 2
Group E	6,000 & 21,250	14.17	+36
Division II — Paper Converting		8.19	− 4
Paper Bags		6.60	−15
Boxes & Cartons		9.90	+ 1
Roofing Paper		4.77	−31
Insulation & Bldg Bd		6.66	−18
Pulp & Paper Specialties		7.04	+ 3
Division III — Pulpwood Logging		30.45	− 9

DIVISION I — Pulp and Paper Mills

Group A

There were no perfect scores in this group. The three top-ranking companies were: P. H. Glatfelter Co., Spring Grove, Pa. (1.31); Crown Zellerbach Corp., Camas, Wash. (1.34); Sonoco Products Co., Hartsville, S. C. (1.36).

Group B

Price Bros. & Co. Ltd., Riverbend P. Q. Canada (.00); Consolidated Paper Corp. Ltd., Port Alfred, P. Q. Canada (.00); Kimberly-Clark Corp., New Milford, Conn. (.00).

Group C

Donohue Bros. Ltd., Charlevoix, Quebec, Canada (.00); Crown Zellerbach Corp., Carthage, N.Y. (.00); Pacific Coast Paper Mills, Bellingham, Wash. (.00).

Group D

Owens-Illinois Glass Co., Big Island, Va. (.00); Congoleum Nairn Inc., Cedarhurst, Md. (.00); Columbia Box Board Mills Inc., Chatham, N.Y. (.00); Container Corp. of America, Carthage, Ind. (.00); U. S. Gypsum Co., Clark Township, N.J. (.00); Certain-Teed Products Corp., Richmond, Calif. (.00); Crown Zellerbach Corp., Lebanon, Ore. (.00); Philip Carey Co. Ltd., Lennoxville, Quebec, Canada (.00); U. S. Gypsum Co., South Gate, Calif. (.00); U. S. Gypsum Co., Oakmont, Penn. (.00); Bestwall Gypsum Co., Pryor, Okla. (.00); Coos Bay Pulp Corp., Anacortes, Wash. (.00).

Group E

Johns-Manville Corp., Asbestos, P. Q., Canada (.00); National Gypsum Co., Kalamazoo, Mich. (.00); Rogers Corp., Rogers, Conn. (.00); U. S. Gypsum Co., Galena Park, Texas (.00); National Gypsum Co., Anniston, Ala. (.00); Amalgamated Roofing Mills, Chicago, Ill. (.00); U. S. Gypsum Co., Oakfield, N.Y. (.00); Celotex Corp., Madison, Ill. (.00); Kimberly-Clark Corp., Kapuskasing, Ontario, Canada (.00); Pollock Paper Corp., Columbus, Ohio, (.00); U. S. Gypsum Co., Gypsum, Ohio (.00); International Paper Co., Livermore Falls, Me. (.00); Celotex Corp., Avery, Ohio (.00); Johns-Manville Corp., Tilton, N.H. (.00); National Gypsum Co., Newburgh, N.Y. (.00); Spaulding Fibre Co. Inc., Hayes Plant (.00); Marshall Bros., Yorklyn, Del. (.00).

DIVISION II — Converting

Paper Bags

Union Bag-Camp Paper Corp., Richmond Plant (.00); Virginia Carolina Chemical Corp., Atlanta, Ga. (.00); St. Regis Paper Co., Los Angeles, Calif. (.00); St. Regis Consolidated Packaging Ltd., Vancouver B.C., Canada (.00); St. Regis Paper Co., Nazareth, Pa. (.00); St. Regis Paper Co., San Leandro, Calif. (.00); Regis Paper Co., Playa Ponce, P. R. (.00); Racquette River Paper Corp., Potsdam, N. Y. (.00).

Group A

Container Corp. of America, Philadelphia, Penn. (.00); Gaylord Container Corp., Baltimore, Ohio (.00); Container Corp. of America, Anderson, Ind. (1.34).

Group B

Continental Can Co. Inc., Thames River Plant (.00); Crown Zellerbach (Gaylord Container Div.), Atlanta, Ga., (.00); Hankins Container Co., Union, N. J. (.00); Owens-Illinois Glass Co., Chicago, Ill. (.00); Dairypak Inc., Cleveland, Ohio; Mengel Co., Louisville, Ky. (.00); St. Regis Paper Co., Mt. Wolf, Pa. (.00); Fibreboard Paper Products Co., Sumner, Wash. (.00); Crown Zellerbach (Gaylord Container Div.), Milwaukee, Wis. (.00); Container Corp. of America, Greensborough, N. C. (.00); Owens-Illinois Glass Co., Madison, Wis. (.00); Owens-Illinois Glass Co., Miami, Fla. (.00).

Continued on page 188

Buyer's Memo to Himself:

Need supplier with know-how Call Marathon

A DEPENDABLE SOURCE FOR QUALITY CONVERTING MATERIALS

The ablest personnel in the paper business staff Marathon operations in all parts of the country. Mill managers, technicians, woodlands supervisors, engineers—all know their business thoroughly. Their talents are at your service.

Keep Marathon in mind for pulp, printing papers, paperboard and specialty materials.

Pulp, Paper and Paperboard Department

marathon

A Division of American Can Company

MENASHA, WISCONSIN

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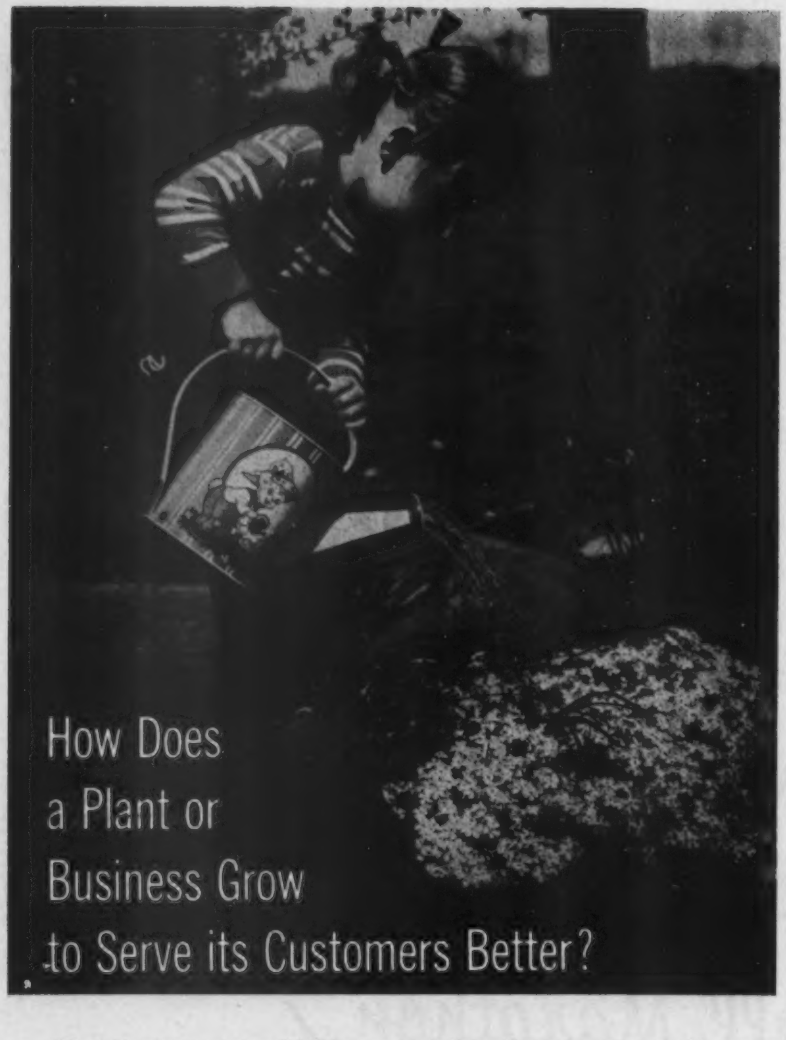

Most businesses are highly competitive. Ours is no exception. Yours probably isn't, either. How then—in face of stiff competition—does a business grow, expand its facilities, products, and services?

There is only one answer, based on our experience, which has led to steady growth and development during the past few years: *dedication.*

Dedication to product quality. Dedication to service. Dedication to meeting customer requirements.

Today TPP serves you from 5 strategically located plants, each capable of producing a complete range of tubes and cores of the finest quality.

If you are looking for a dependable source of tubes or cores, it will pay you to talk with us.

TPP TEXTILE PAPER PRODUCTS inc.

Specialists in tubes and cores for textile and paper industries

CEDARTOWN, GEORGIA Home Office and Plant
Other Plants In: Carlyle, Illinois — Crossett, Arkansas
Jacksonville, Florida — Mobile, Alabama

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SAFETY NEWS

Continued from page 186

Group C

Container Corp. of America, Baltimore, Md. (.00); Container Corp. of America, Cleveland, Ohio (.00); Container Corp. of America, Renton, Wash. (.00); Olin Mathieson Chemical Corp., Kansas City, Kansas (.00); Container Corp. of America, Boston Container Division (.00); Dairypak Inc., Athens, Ga. (.00); Pollock Paper Corp., Dallas, Texas (.00); Longview Fibre Co., Seattle, Wash. (.00); Weyerhaeuser Timber Co., Seymor, Ind. (.00); Owens-Illinois Glass Co., Minneapolis, Minn. (.00); Weyerhaeuser Timber Co., Houston, Texas (.00).

Weyerhaeuser Timber Co., Lapuente, Calif. (.00); Niagara Corrugated Container Division of St. Regis (.00); International Paper Co., Raleigh, N. C. (.00); Mead Container Corp., Miami, Fla. (.00); Crown Zellerbach (Gaylord Container Div., Miami, Fla. (.00); International Paper Co., Youngstown, Ohio (.00); Container Corp. of America, Fresno, Calif. (.00); Crown Zellerbach Corp. (Gaylord Container Div.), Plymouth (.00); Weyerhaeuser Timber Co., Carpentersville, Ill. (.00); Mengel Co., Lexington, Ky. (.00); International Paper Co., Miami, Fla. (.00).

Roofing Paper

U. S. Gypsum Co., South Gate, Calif. (.00); Certain-Teed Products Corp., Dallas, Texas (.00); Ruberoid Co., Lake Erie, Pa. (.00); Johns-Manville Corp., Marrero, La. (.00); Celotex Corp., Cleveland, Ohio (.00); U. S. Gypsum Co., St. Paul, Minn. (.00); Canadian Gypsum Co. Ltd., Mt. Dennis Plant (.00); Certain-Teed Products Corp., Kansas City, Mo. (.00); Murray Brantford Roofing Co., St. John (.00); Murray Brantford Roofing Co., Lachine (.00); Certain-Teed Products Corp., Tacoma, Wash.

Insulation and Building Board

Simpson Timber Co., Shelton, Wash. (.00); Kaiser Gypsum Co., St. Helens, Ore. (.00); U. S. Gypsum Co., Pilot Rock Plant (.00); Abitibi Power & Paper Co. Ltd., Sturgin Falls, Ontario, Canada (.00); Weyerhaeuser Timber Co., West Memphis, (.00).

Specialties

St. Regis Paper Co., Kalamazoo, Mich. (.00); Orchard Paper Co., St. Louis, Mo. (.00); Dixie Cup Division of American Can Co., Lexington, Ky. (.00); Wrenn Paper Co., Middletown, Ohio (.00); Kimberly-Clark Canadian Ltd., Winnipeg, Canada (.00).

Pulpwood Logging

Abitibi Power Paper Co. Saulte St. Marie, Ontario, Canada (10.24); Chesapeake Corp. of Virginia, West Point, Va. (11.94); Abitibi Power & Paper Co., Iroquis Falls, Ontario, Canada (12.50).

Institute of Paper Chemistry

John Bachhuber has been appointed supervisor of machine computation at the Institute. He will be responsible for the scheduling and use of the maintenance of the program library. He is also secretary of the Institute's computer committee.

Gilman Paper Co.

Simon Posen has been promoted to the office of Vice-President in charge of special assignments. Posen has functioned importantly in the company's expanded manufacture of pulp and paper.

Stuart Bergman, for the past six years assistant director of the technical department, has been promoted to director of technical services.

Weyerhaeuser Co.

Merrill D. Robison, manager of the Grays Harbor pulpmill, has been assigned to the Tacoma office as assistant manager of manufacturing of the pulp and paperboard division under LeRoux.

John R. Callahan Jr., production manager of board at the company's Longview pulp mill, replaces Robison.

Spencer M. Smith has been appointed manager of pulp sales. With headquarters in New York, Smith will supervise pulp sales in the three regions of Weyerhaeuser's pulp and paperboard division.

Walter G. Aagaard has been named manager of midwest board sales for Weyerhaeuser's pulp and paperboard division. His headquarters will be in Chicago.

Kenneth W. Hultgren has been appointed to the newly created post of general credit manager of the company.

Clinton Corn Processing Co.

W. Andy King has been appointed Clinton sales representative in the South Carolina area. He previously was engaged with motor freight sales.

Zellerbach Honored by Marketing Group

Harold L. Zellerbach, Chairman of the Executive Committee of Crown Zellerbach Corp. (left), receives plaque honoring him as 1961 winner of the American Marketing Assoc.'s Parlin Memorial Award for outstanding achievement in the field of marketing. Making the presentation in Philadelphia is Charles Coolidge Parlin, son of the founder of the award which was established in 1945.

Continental Can Co.

K. M. Lewis has become manager of the Chicago paper products plant of the Bondware Division. Formerly assistant plant manager at this location, Lewis replaces Drotziger, who has retired.

Albert J. Aycock has been appointed to the position of assistant superintendent — paper mill, of the new Continental Can Co. Bleached Sulphate Paperboard mill at Augusta, Ga. Aycock has had extensive experience with several paper companies and began his career with International Paper Co.

K. M. Lewis

A. J. Aycock

Syracuse University

Harry M. Gray, president of the Empire State Paper Research Associates Inc. and vice president and director of manufacturing for Sealright-Oswego Falls Corp., Fulton N.Y., has been appointed to the faculty as adjunct professor, pulp and paper technology. In this capacity Gray will be called upon as a guest lecturer at the College of Forestry, and as a special counselor to the college with respect to research and technical problems in the pulp and paper field.

Stora Kopparberg Corp.

Dr. Harold Bialkowsky has been appointed assistant to the president of this company of New York. Bialkowsky will be in charge of cellulose research and product development. He recently resigned from Weyerhaeuser Co. where he had served as research director of the pulp and paperboard division.

Johns-Manville

Charles F. Briggs has been appointed sales representative in the Atlanta, Ga., territory for this company of Toledo, O. Briggs will be responsible for handling nine different types of glass textile fibers, yarns and mats used for plastics paper and tape reinforcement.

August Beucke has been appointed sales representative in the Cleveland, O. area. He will be handling the same products as Briggs.

CIBA Co. Inc.

This company of Fair Lawn, N.J. has announced a reorganization of the sales and administrative positions.

Dr. C. J. Weidmann, vice president and technical director, assumes increased responsibilities in the direction and co-ordination of the three product divisions.

C. O. Stevenson, formerly sales manager of the company's southern

district, has been named manager of the dyes division.

P. J. Luck and P. L. Penaud continue as managers of the chemical specialties division and pigments division respectively.

F. P. Russell, formerly manager of CIBA's Philadelphia district, has been named commercial manager.

F. E. Nevins, formerly sales supervisor of the Philadelphia district, has been named manager of the Philadelphia district.

E. R. Rogers, formerly working on special assignments, has been named supervisor of marketing services.

A. L. Perrin has been appointed manager of the company's midwest district. He succeeds J. Gordon Stott who has retired after 40 years of service with this Fair Lawn, N.J. company.

Roy D. Wiggins has been added to the staff in the southern district. He will be based in Charlotte, N.C. and will work under the direction of E. Pierce Work, technical manager.

Donald A. Gardner will also work out of that office as a technical representative.

Southern Land, Timber & Pulp Corp.

Bruce P. Ellen has been appointed production manager for the new mill soon to be built at Cedar Springs, Ga. Presently general superintendent of the Point Wentworth plant of Continental Can Co., Ellen will undertake his new duties in May.

B. P. Ellen

F. Caskey

Dearborn Chemical Co.

Frank Caskey has joined Dearborn Chemical Co. as a sales representative for Oregon and Washington. Caskey was manager of technical sales in the paper field for Morden Machine Co. and a senior research chemist for Crown Zellerbach Paper Co.

Chase Bag Co.

Eugene P. Alexander has been appointed manager of the company's multiwall bag division. In his new post, Alexander's offices will remain at Chase headquarters in New York.

Columbia Cellulose Co. Ltd.

C. D. Bown has been appointed assistant technical superintendent at the Prince Rupert mill. In his new post he will direct the activities of the Acetate and Viscose pilot plants and the main and control laboratories, assist in the formulation and execution of the process engineering program and co-ordinate mill production with sales.

Dow Chemical Co.

William F. Fisher has been appointed chemicals field salesman to serve the pulp and paper industry in northern Wisconsin. Fisher will work out of Dow's Minneapolis, Minn., office but will live in Appleton, Wis. He succeeds Theodore G. Moore, who recently was transfered to the Midland, Mich., headquarters.

Nashua Corp.

Denis McCarthy has been appointed assistant manager, customer service department of this company at Nashua, N.H.

James L. Booth has been appointed customer service design engineer. Booth previously had been with Nashua Industrial Machine Corp.

Downingtown Paper Co.

George Stecker has been appointed product manager of the Packaging Division of the company at Downingtown, Pa. Stecker's responsibilities include directing and developing the over-all marketing of Stretch-Packaging. His work will include combined technical and sales service to customers.

NECROLOGY

Albert L. Armitage

Albert L. Armitage was manager of Commercial Printing Paper Sales for West Virginia Pulp and Paper Co. Well known in the printing and publishing industries, Armitage had worked for the paper company for 40 years. He was a member of the company's sales staff in San Francisco for 18 years before returning to New York in 1955 to head up national sales of printing papers. Armitage was a member of the board of directors of the Lithographic Technical Foundation and active in the Lithographers and Printers National Association.

Henry G. Steinson

Henry G. Steinson of Evanston, Ill., was the retired president of the American Envelope Co. of Chicago, Ill.

Alan G. Goldsmith

Alan G. Goldsmith was former vice-president of Mead Corp. and chairman of the board of Mead Sales Corp. Beginning with the company in 1925, he represented the Mead group in the National Paperboard Association.

John Fridolph

John Fridolph was formerly an engineer for Sorg Paper Co. He had been ill for ten years.

Michael J. Lawless

Michael J. Lawless was founder and president of Lawless Bros. Paper Mills Inc. He founded the business in East Rochester in 1918 and was its sole president. The plant manufactures boxboard.

F. Dana Payne

F. Dana Payne was founder of the Daka Paper Co., Erie, Pa. Dana founded the company in 1928 and was president for 30 years.

Roy W. Shaver

Roy W. Shaver, was former president and general manager of the Gould Paper Co., a subsidiary of Continental Can Co., and later, until his retirement last year, was vice president in charge of manufacturing for the Alton Box Board Co. of Alton, Ill. Shaver had been associated with Escanada Paper Co., Abitibi Power & Paper Co., Oswego Falls Sealright Co. and Taggart Mill Co.

Vern B. Dunifon

Vern B. Dunifon was manager of the Continental Can Co. located in Tonawanda, N.Y. He had managed the company's plant since 1950. Dunifon was formerly associated with the Van Wert, Ohio, plant of the company.

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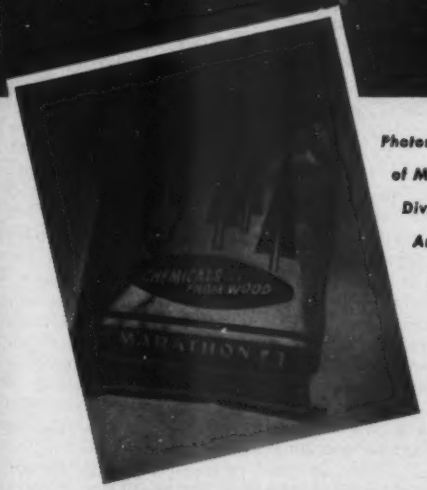

Photos courtesy of Marathon, Division of American Can Co.

Marathon, Division of American Can Company, is showing the way to effective stream pollution control by turning its concentrated spent sulphite liquor into a dry product for industrial uses.

The new Nerco-Niro spray dryer at Marathon's Green Bay pulp and paper mill provides for 50 tons of finely powdered chemicals now being produced each day and sold under the trade name of "Norlig."

The "Gentle-ized" spray drying process produces a free-flowing granule of exceptionally high bulk density through use of a special atomizer wheel which was developed to cope with the liquor concentrate. Working as a team, Marathon and Nichols technicians conducted extensive trial runs at the Nerco-Niro laboratories. Based on the successful results of these laboratory investigations, the Nerco-Niro organization was chosen to proceed with the design and construction of the spray dryer shown.

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FOREIGN ABSTRACTS

Effects of thiosulfates in acid bisulfite cooking

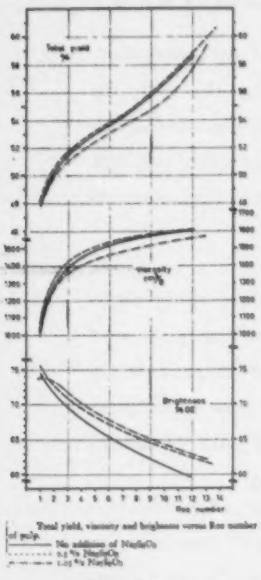


Figure 1

A study was made of the effect of adding sodium thiosulfate (0.5 and 1.25 per cent) on the course of the acid sodium bisulfite digestion of spruce wood and on certain pulp properties. Thiosulfates retard delignification, probably due to the interaction of this component with the sulfonatable groups in the lignin. During the early stages of the cook, carbohydrates apparently dissolved more slowly than when the thiosulfates were absent. During the latter stages, the rate of carbohydrate removal was about the same for both (initial) thiosulfate concentrations. At the lower concentration, the yield at a specific Roe number was about the same as when thiosulfates were absent; at the higher thiosulfate concentration, yields were somewhat lower. Brightness of the pulp increased at the higher thiosulfate concentration, and at this concentration the pH (measured at 20°C.) was lower throughout the cook. The introduction of thiosulfates increased the sulfate production in the spent liquor. Fig. 1 shows the total yields, the viscosities, and the brightness (plotted against Roe numbers) when no thiosulfate was added (solid line), when 0.5 per cent was added (- - - - - -) and when 1.25 per cent was used (-. -. -. -. -. -. -.).

Nils Hartler, lennart Lind, and Lennart Stockman. **Svensk Papperstidn. 64,** 160-166 (1961) (15 references). (In English).

New antioxidants used in food packaging

The following were approved by the French Ministries of Health and Commerce, for use as additivies in paper and boards used in food packaging: - propyl-, octyl- and dodecyl gallates, and di-tert-butyl-p-cresol (termed "IONOL"). The latter is harmless and when incorporated in amounts of 0.1-0.5 per cent prevents oxidation of fats.

Maurice Pariat. **Rev. papiers et cartons 22,** No. 24, 15-17 (1959) in French; through **Abstr. Bull. Inst. Paper Chem. 31,** 955 (1961).

Fate of thiosulfates in the sulfite cook

Studies by Samuelson and Westlin (**Svensk Papperstidn 51,** 179 (1948)) showed that thiosulfates formed by various side reactions in the sulfite cook are practically eliminated during this digestion. The process probably involves a lignin-thiosulfate reaction. The present paper describes experiments in which the following were cooked in the presence of cooking liquors containing thiosulfates: spruce wood, Björkman lignin, lignosulfonic acid, veratryl alcohol, vanillyl alcohol, and formaldehyde.

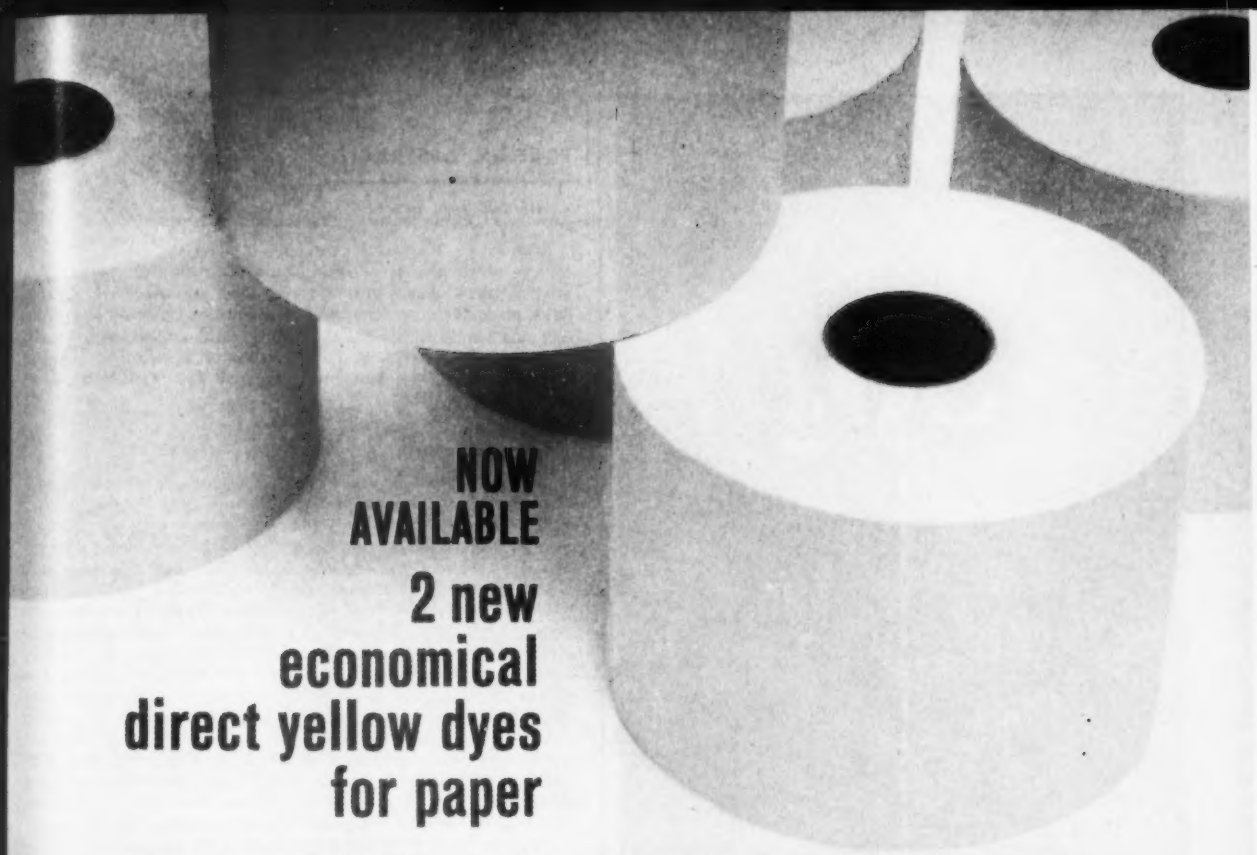
The conclusions reached are that the sulfite digestion entails a transformation of the benzyl alcohol or benzyl ether groups, present in the original lignin, into sulfide groups. E.g. veratryl alcohol reacted with thiosulfate, showed that the latter was decreased, giving diveratryl sulfide. Vanillyl alcohol gave the corresponding sulfide, which then reacted further to give a sulfonic acid. Hydrogen sulfide, generated in this reaction gave polythionates. Methods for the determination of thiosulfate and polythionate in acid sulfite solutions, are described briefly.

Fourteen references. Morit Goliath and Bengt O. Lindgren. **Svensk Papperstidn. 64,** 109-112 (1961) (In English).

Comparison of acid bisulfite, bisulfite, and kraft cooks

This is the second report on the effects of pH on sulfite cooking (cf. **Svensk Papperstidn. 64,** 33 (1961)). The present study covers bleached and unbleached spruce pulps, unbleached birch pulp and pine pulp, as well as those resulting from a mixture of hard-and softwoods. The most extensive work was done on unbleached spruce pulps, for which the yields, kappa numbers, brightness, viscosity, strength properties, extractives and deposited resins were determined as well as the "defibration point". The latter is defined as the "yield, or the kappa number, at which a screenings content of 1 per cent is obtained in an NAF water jet defibrator". This point is dependent largely on the percentage of lignin, its type, and its distribution. The main results of this comprehensive study may be summarized as follows. In the case of spruce the unbleached total pulp yield is about the same for acid calcium bisulfite and sodium bisulfite pulping, but is lower in the case of kraft pulping. The defibration point is higher for sodium bisulfite pulping than for acid calcium bisulfite pulping, but the more complete the impregnation the smaller is that difference. The unbleached brightness is somewhat higher, and the strength properties are much higher for sodium bisulfite pulp than for the acid calcium bisulfite pulp. Kraft pulp however is the strongest. The relationship between tear factor and breaking length is shown diagrammatically, with the pulp yield and the degree of beating as parameters. The acid calcium bisulfite pulp has less tendency to give resin deposits than does the sodium bisulfite pulp. Although the bleached yield is about the same for the two sulfite processes, from the standpoint of quality, bleaching the sodium bisulfite pulp (because of its lower unbleached viscosity) is the more critical, when compared with bleaching the acid calcium bisulfite pulp. At pH 4, the pulp has a higher opacity. In cooking birch, the sodium bisulfite method gives a higher yield than does the other. However the sodium bisulfite cook gives a much narrower range of variation (due to the relatively low defibration point, and risk also of black cooks). Here (in the case birch) the strength properties are higher for sodium bisulfite than for acid calcium bisulfite cooks. Following good impregnation, the sodium bisulfite process apparently offers the possibility of pulping pine wood, provided the cook is prolonged to a relatively low Roe number. There are less differences in the rates of delignification for spruce, birch and pine when the sodium bisulfite method is used than when the acid calcium bisulfite technique is employed. Thus, when these species are cooked together, a more homogeneous pulp is obtained by the sodium bisulfite than by the acid calcium bisulfite method. Ex-

Continued on page 194



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FOREIGN ABSTRACTS

Continued from page 192

tensive data are given (in tabulated form, and in suitable graphs) on yields, screenings, kappa numbers, G. E. brightness, viscosities, beating, breaking lengths bursting strengths, tear factors, and folding endurance of the various pulps.

Twenty references and 12 graphs. Nils Hartler, Lennart Stockman and Ove Sundberg. **Svesnsk Papperstidn** 64, 67-85 (1961) (In English).

Vortex cleaner

A modern piece of equipment designed for cleaning stock at high consistencies was studied at the Lodz Polytechnic Institute in Poland. The study was carried out with a kraft pulp that had been contaminated deliberately with sand of various sizes, with metallic particles, fragments of rags and with old newspapers that were badly soiled. The consistencies, throughout, and the type of impurities were varied so as to obtain optimum conditions, and to make a thorough investigation of the actual cleansing effect of the vortex. Apparently the cleaner worked very efficiently and with a relatively low power consumption. It separated all the impurities from the stock that passed through a normal hydrapulper, and only with very fine sand (having a particle size of less than 0.5 mm.) was the separation incomplete. The efficiency was greatest with a flow rate of 450-500 liters per minute and a stock density of 4.5 to 5 per cent. When these were exceeded, the cleaning effects decreased. It was shown that the cleaning results were somewhat better, at lower consistencies, but when operations were carried out at this level, the throughput was reduced and the process was no longer economical. In any event, the reduction in consistency caused only a slightly better cleaning action. It appeared best to install the centrifugal cleaner (for waste paper) after the hydrapulper, and then pass the cleaned pulp through a chest to a hydrarefiner which operates most economically at 4 per cent stock density. Thus it is possible to cause defibering at a high density, quite economically This obviates diluting the stock after the hydrapulper, and then thickening it again before the refiner. This is not necessary with the new vortex.

A. Kikiewicz. **Przeglad Papierniczy** 193-7 (1959), through **Paper Maker** 57-8 (March 1961).

Light scattering coefficients from reflectance data

When the reflectances of a paper sheet of given basis weight are known, the reflectances and printing opacity of a sheet (made from similar stock) of a different basis weight can be calculated by means of the Kubelka-Munk equation. However the calculations are tedious. Previously published graphs have only a limited range and accuracy. The present authors present a very extensive and convenient set of tables, which permit a simpler calculation of the term **Sx** (where **S** is the scattering coefficient and **x** is the sheet thickness or the weight proportional to the thickness). E.g. $Sx = sW$, in which **s** is the specific scattering coefficient and **W** is the basis weight of the paper. R_∞ and R_o are respectively the reflectance of a pile of sheets, so thick that no light is transmitted, and (R_x) the reflectance of a single sheet backed by perfect black. To give a specific example, by using the tables, when $R_\infty = 63$ per cent and $R_o = 61.5$ per cent, $Sx = 3.45$ (obtained by interpolation), and this closely approximates the actual value 3.39. For most applications this slight error obtained interpolation is not serious. When more accurate interpolations are required, more elaborate methods can be used (cf. S. K. Kunz, "Numerical Analysis", McGraw-Hill Book Co. Inc. N.Y. 1957.) Calculations leading to the tables were made on an IBM. 650 electronic digital computer. The work emanates from the Pulp and Paper Research Institute of Canada.

E. B. Koller and S. M. Chapman. **Svensk Papperstidn 64**, 113-124 (1961) (in English).

Dr. Melvin Nord

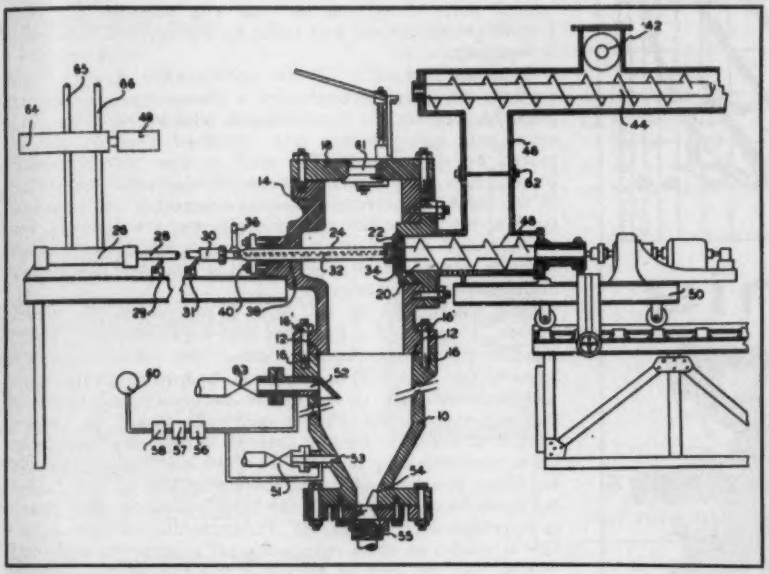
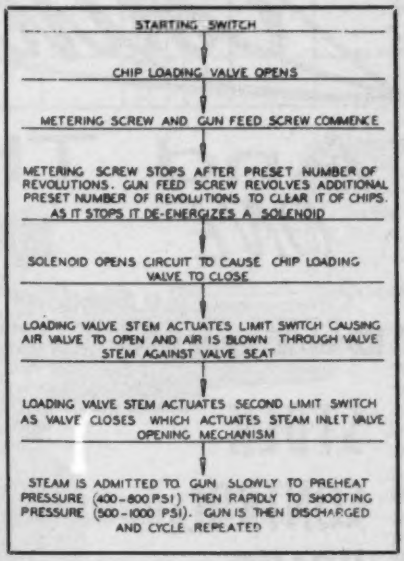


Figure 2 (below) shows the sequential steps in the operation of the apparatus which is shown in Figure 1 (left).


STARTING SWITCH
CHIP LOADING VALVE OPENS
METERING SCREW AND GUN FEED SCREW COMMENCE
METERING SCREW STOPS AFTER PRESET NUMBER OF REVOLUTIONS. GUN FEED SCREW REVOLVES ADDITIONAL PRESET NUMBER OF REVOLUTIONS TO CLEAR IT OF CHIPS. AS IT STOPS IT DE-ENERGIZES A SOLENOID
SOLENOID OPENS CIRCUIT TO CAUSE CHIP LOADING VALVE TO CLOSE
LOADING VALVE STEM ACTUATES LIMIT SWITCH CAUSING AIR VALVE TO OPEN AND AIR IS BLOWN THROUGH VALVE STEM AGAINST VALVE SEAT
LOADING VALVE STEM ACTUATES SECOND LIMIT SWITCH AS VALVE CLOSES WHICH ACTUATES STEAM INLET VALVE OPENING MECHANISM
STEAM IS ADMITTED TO GUN SLOWLY TO PREHEAT PRESSURE (400-800 PSI) THEN RAPIDLY TO SHOOTING PRESSURE (500-1000 PSI). GUN IS THEN DISCHARGED AND CYCLE REPEATED

Apparatus for disintegration of fibrous material

U.S. 2,961,041, issued Nov. 22, 1960 to Frank G. Lesniak and assigned to Masonite Corp., describes an automatic apparatus for carrying out the disintegration of fibrous material.

The apparatus consists of a pressure chamber having a steam inlet, a discharge port equipped with rapid opening and closing means, a feed port, and a valve adapted to open and seal said feed port. The valve is mounted on a valve stem connected to a hydraulic cylinder. The valve stem and valve contain a passage adapted to admit a gaseous medium in the open position of the feed port. Screw-type metering and feeding means charge to the pressure chamber a predetermined quantity of lignocellulose particles. Means are provided for sequentially energizing the valve, the metering and feeding means, the steam inlet, and the discharge port.

Paper stock recovery process

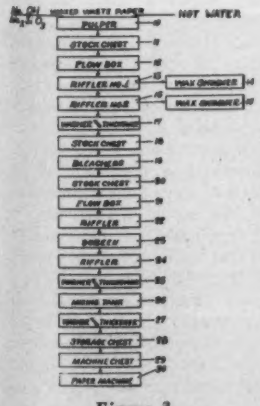


Figure 3

U.S. 2,959,513 issued Nov. 8, 1960 to Russell H. Savage and assigned to Mead Corp., describes a process for the recovery of the essential fiber content and the wax of waste waxed paper.

It has been found that waste papers containing large quantities of wax, as for example paraffin or microcrystalline waxes, may be readily dewaxed without any unusual operating difficulties or costs, and that the resulting defibered material may be bleached so as to restore the fibrous material to a desirably white color so as to impart brightness equal to good grades of chemical pulp. Such fibrous material has been satisfactorily used as the furnish as well as in the furnish for producing pulp products and high quality bond, tissue, book or magazine paper. This high quality paper has a color and brightness comparable to the best grades of magazine or book papers. Moreover, this result is accomplished without the necessity of difficult or costly operations or apparatus.

As illustrated schematically in Fig. 3 the waxed waste paper is introduced to a pulper, along with NaOH and Na_2SiO_3, and steam is passed through a heating coil, to raise the temperature to 170° F. After a sample shows that the separation of the fibers has been completed and that the wax has been separated, the temperature is dropped to 120° F. by adding cold water, so that the wax forms small nodules on the surface of the batch. Any pigment content of the stock is entrained in these nodules.

From the pulper 10, the stock batch is pumped into a stock chest 11. From the stock chest 11 the batch is pumped through a flow box 12 where it is reduced to a consistency of .5 per cent. From the flow box 12 the batch is passed to the first riffler 13. Riffler 13 is of considerable length, giving approximately 200 feet of travel to the batch. During this first riffling a high percentage of the "agglomerated" wax and entrained pigment particles float to the top of the batch and are skimmed off at the terminal end of the first riffler 13 by means of a series of skimmers 14 which are slowly actuated by an endless chain assembly. A considerable amount of pigment is absorbed on the "agglomerated" wax

Continued on page 196

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Continued from page 195

particles. In the first riffler 13 approximately 95 per cent of the wax content of the stock is removed and this wax together with entrained pigment is removed from the terminal end of riffler 13 as well as from wax skimmer 14 and is passed to appropriate wax tanks for storage and transmittal to wax trays.

From the first riffler 13, the substantially dewaxed and partially depigmented fiber stock is passed through a second riffler 15, wherein the consistency is held at .5 per cent and more wax agglomerates and entrained pigment are removed by skimmers 16. The stock is then passed through screens to a washer and thickener 17 where the consistency of the stock is increased to approximately 5 per cent and more of the suspended wax and pigment are removed. The washed and thickened stock is then dumped into another stock or storage chest 18 wherein it is held at a consistency of approximately 5 per cent.

From stock chest 18, the stock is pumped to the bleach towers, 19, where it is bleached and substantially all of the remaining wax and pigment content are removed. Sodium hypochlorite (NaClO) and sodium hydroxide (NaOH) are added to the stock in the bleach towers 19 in amounts of approximately 2 and 2.5 per cent respectively by air dry weight of the fiber content thereof, thereby increasing the pH to approximately 10.0 to 11.25 and bleaching is continued for about one hour at a temperature of 110° to 115° F. The temperature of the stock in the bleach tower is then raised to approximately 140° to 165° F., ammonium aluminum sulfate is added so as to reduce the pH to approximately 6.25 to 6.75, and the stock is treated at this temperature and pH for one hour. The temperature of this stock is then dropped to below the melting point of the wax by the introduction of cold water into the bleach towers 19 to accomplish the formation and "agglomeration" of residual wax which has been removed from the fibers.

The bleached stock is then dumped from the bleach towers 19 to stock chest 20. From this stock chest, the bleached stock is then pumped to another flow box 21 where the consistency of the stock is again reduced to approximately .5 per cent. From this flow box, the stock is passed to a long riffler 22 where the small remaining residue of "agglomerated" wax in the bleach tower is removed by skimming.

After this riffling, the stock is passed over a screen 23 where the fibers are screened and all undefibered stock and remaining wax agglomerates are rejected and returned back to the pulper 10 for reprocessing.

From the screen 23, the screened fibers are pumped to a final riffler 24 where all remaining dirt and wax traces are removed. From this riffler 24, the stock at a consistency of .5 per cent passes by gravity to washer and thickener 25 where any remaining pigment is washed out and the stock is thickened to a consistency of approximately 5 per cent. The thickened stock is then passed to a mixing tank 26 where water is added to reduce the consistency again to .5 per cent. From mixing tank 26, the stock is passed to a washer and thickener 27 where it is washed completely and thickened to a consistency of 5 per cent. The thickened stock is then passed to storage chest 28 from which it is pumped to machine chest 29. From machine chest 29, the stock is pumped through a conventional mixing box, head box and finally to the paper machine 30, where the bleached, dewaxed and depigmented fibers are formed into pulp sheets and dried and rolled for delivery to the consumer.

Wet strength paper

U.S. 2,965,436, issued Dec. 20, 1960 to Michelangelo de Domenico and Giovan-Battista Riccardo de Domenico, as-

Continued on page 210

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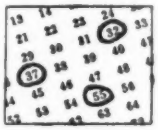

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New Products and New Literature

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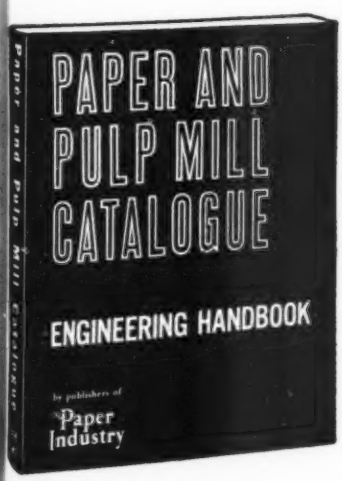

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New Products and New Literature

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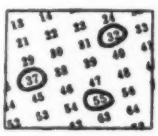
FOR FURTHER INFORMATION ON

- New Products
- New Literature
- Advertised products and services

Use this Return Card

To obtain further information quickly—and at no obligation—on any of the above items in this issue, circle the corresponding number on the attached card. We will forward your request promptly to the manufacturer, who will send the information directly to you.



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CONTENTS:

- **Manufacturers Catalogue Section** — contains pages and complete inserts giving information and data on products of individual manufacturers. Pages appear in alphabetical order by names of manufacturers.
- **Buyers Service Section** — includes a comprehensive, cross-reference list of machinery, equipment, materials and chemicals with names of responsible manufacturers and suppliers; a list of trade names; complete addresses of all firms that are listed in the Section; and a directory of educational institutions in the United States and Canada having courses of instruction in the manufacture of pulp and paper.
- **Engineering Handbook Section** — a compilation of practical engineering data, formulas, graphs, charts, tables, etc., including a section dealing with uses and hazards of chemicals used in pulp and paper making. New material added yearly.

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Chicago 5, Illinois

Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

Vinyl resins

"Elvax" vinyl resins are specifically designed for compatibility with paraffin wax. They are copolymers of ethylene and vinyl acetate. Typical uses include the packaging field where they are used as hot-melt adhesive coatings, pressure-sensitive adhesives, water and water vapor barrier coatings, and as a wax additive to improve flexibility, toughness and heat-seal bond strengths of wax coatings. In paper making they can be used as a wax additive to toughen wax coatings, as wax-extended polymers for application to sheet or board by hot-melt process, and as heat-activated adhesive coatings. — E. I. DuPont De Nemours & Co. Inc.

Circle No. 1 on Readers' Service Card

Plastic pressure pipe

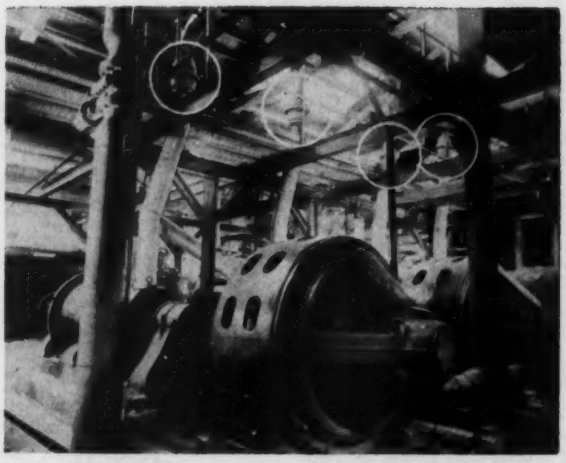
A standard line of corrosion proof reinforced plastic pressure pipe capable of withstanding pressures up to 100 psi at temperatures as high as 250°F. is now available. The pipe is furnished in fiberglass mat and cloth construction. Wall thickness ranges from 1/4 to 5/8 in., depending on pressure and temperature requirements. — Ceilcote Co.

Circle No. 2 on Readers' Service Card

Starch ether gums

A new series of starch ether gums for use in making paper are called Essex gums. The unique properties of the gums are achieved through the substitution of ether side chains for hydroxyl groups within the starch molecules. These gums are said to be unique for the industry and offer advantages in pigmented coatings. They are made in a wide range of viscosities which can be prepared in a 40-45 per cent solids concentration. — Penick & Ford Ltd. Inc.

Circle No. 3 on Readers' Service Card



Flow control valve

Maximum benefits from the pressure loop system in paper pulp processing are said to be obtained by use of a new flow valve. Controlling pulp flow in the manner of a variable venturi with smooth entrance and exit areas, the valves eliminate pulp build up and corrosion problems inherent in conventional-design valves. — Clarkson Co.

Circle No. 4 on Readers' Service Card

Variable flow meter

An improved version of the variable area flow meter for fluid metering will be marketed under the name of "Varea-meter" in glass-tube and metal-tube models. It features corrosion resistance, reduced component parts and prevention of misalignment of tube. Three frame arrangements are available: open, with standard enclosure, or with pressure enclosure. The latter is recommended for use with hazardous fluids. — Wallace & Tiernan Inc.

Circle No. 5 on Readers' Service Card

Temperature regulator

A self-operated stainless steel temperature regulator is now available

Continued on page 198

Knox Felts
KNOX WOOLEN COMPANY
CAMDEN, MAINE
America's First Manufacturer of Endless Paper Machine Felts

For more data circle 133 on Post Card

NEW PRODUCTS

Continued from page 197

which is suited to handle tough chemical applications and corrosive or erosive conditions. It is suitable for 300 psi WSP and 500°F. — OPW-Jordan Corp.

Circle No. 6 on Readers' Service Card

Flow regulators

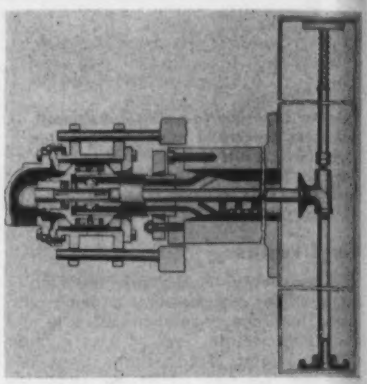
These new flow regulators offer design simplicity in standard models with ⅜ and ¾ in. pipe thread porting. Nominal free flow rates range up to 20 gpm. Maximum controlled flow rate for both sizes is 10 gpm. The units are rated at a pressure of 3000 psi. — Vickers Inc.

Circle No. 7 on Readers' Service Card

Differential autoanalyzer

A new differential AutoAnalyzer for continuous chemical analysis, with automatic blank or interference compensation, that can detect trace materials down to parts per billion with an accuracy of 1 per cent, is now available. It automates all steps of a chemical analysis now performed manually and integrates them into a continuous flow system. The instrument system automatically measures, mixes, purifies, processes, compares and records, and runs 20, 40 or 60 complete tests without supervision. — Technicon Controls Inc.

Circle No. 8 on Readers' Service Card

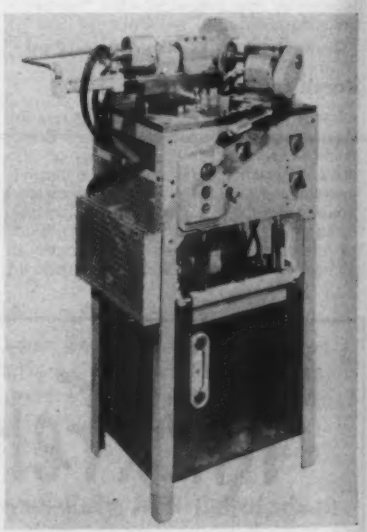


Rotary syphon

This rotary syphon for dryer rolls of paper machines was developed to achieve maximum temperature along the face of the roll, to reduce horsepower demand and to cut maintenance generally. It can be installed on new or existing paper machines, with either open or enclosed gearing.

To evacuate condensate from dryer rolls, the rotary syphon employs a new concept of pick-up design. This holds the film of condensate to a minimum, permitting a more efficient transfer of heat units from the steam to the dryer shell. Pick-up fitting can be located at any point along the shell to keep temperatures more uniform along the face. — Johnson Corp.

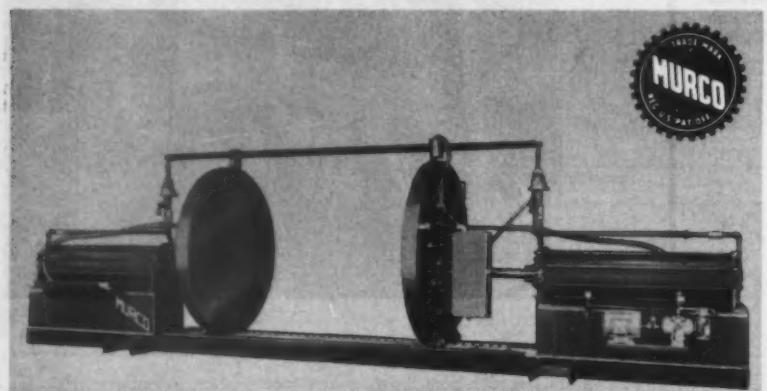
Circle No. 9 on Readers' Service Card



Slitter-grinder

The slitter-grinder, developed specifically for the paper converting industry, is designed to sharpen slitter-knives within the plant, thereby reducing down time and eliminating the

Continued on page 200



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MURCO Roll Heading Machines

Here is a machine that will operate efficiently and continuously day-in-and-day-out without any attention that is so common wih roll heading machines of lighter construction. The pioneer Roll Heading Machine in the industry, MURCO Roll Heading Machines are made in various sizes — 24" to 72" diameter and lengths varying up to 200". Installations in mills throughout the country.

If you ship paper in rolls, just tell us the size of your rolls and your present method of heading rolls . . . we will submit a proposal to meet your requirements . . . without obligation.

- WILL CUT FINISHING ROOM COSTS
- PRODUCE NEATER ROLLS
- IMPROVE ROLL APPEARANCE

- Valve may be operated from any position
- Rollers of solid aluminum or wood
- Heavy frame construction that requires no maintenance

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You won't want to miss the...

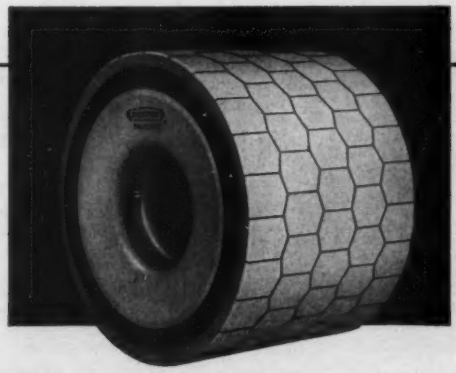
4th International MECHANICAL PULPING CONFERENCE

Edgewater Beach Hotel · Chicago, Illinois, U.S.A.
September 19, 20 and 21, 1961

Norton personnel from all over the world will be there to discuss the latest developments and techniques such as pitless grinding, higher speeds, and in general, how to get the most out of your present equipment.

This conference, jointly sponsored by the Technical Association of the Pulp & Paper Industry, and the Technical Section — Canadian Pulp & Paper Association, will again feature formal papers, round table discussions and new ideas on the production of mechanical pulp.

For the fourth time, a broad range of topics has been selected with authorities from Canada, Germany, Italy and Sweden, among others, scheduled as speakers.



Constant research enables Norton Company to anticipate and meet the requirements of every pulp and paper mill; one of the many reasons why Norton pulpstones are the world's standard for mechanical pulp.

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NORTON PULPSTONES — *the world's standard for mechanical pulp*

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electro-Chemicals — BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

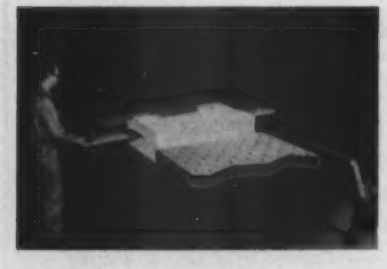
For more data circle 135 on Post Card

NEW PRODUCTS

Continued from page 198

necessity of sending knives out of the plant for sharpening. Occupying 4 sq. ft. of floor space, with immediate plug-in 110/120 electrical connections, the slitter-grinder can fit any size production operation. — Convertor's Machinery & Controls Inc.

Circle No. 10 on Readers' Service Card



Airfloat unstacker

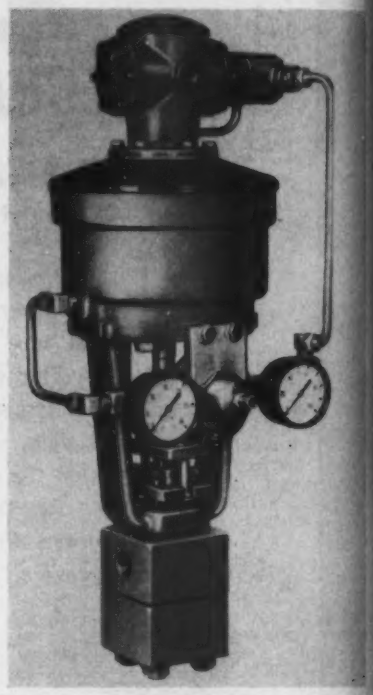
A method of separating and unstacking lifts from skidded stacks has been introduced as a one-man airfloat unstacking mechanism. In principle, it is a hollow-formed blade with orifices. One end is power driven through the stack to separate it at the desired level. The end of the blade opposite the operator fits on a pin on a motorized travel bar. Forward and reverse travel through the stack is controlled by a toggle switch on the handle of the blade. A pusher bar mounted above the blade assists in removing the stack from the skid. — Lamb-Grays Harbor Co. Inc.

Circle No. 11 on Readers' Service Card

Doctor machine reslitter

The model 184 doctor machine reslitter is open-end designed with cantilevered shafts for fast loading and unloading and web threading. It can be used for inspection or separating, production slitting, staggered multi-roll winding, and single roll winding or rewinding, automatically and continuously. A wide range of materials can be doctored, slit and rewound automatically with this model. The rewind roll diameter limit is 18 in. on the standard 184 model. This model is powered with a variable speed electronic drive, which is connected to the pull roll sections as well as the duplex rewind shafts. Standard web speed is 1000 fpm. Tension on the rewind is accomplished through end pressure on the core ends. Constant tension unwind, automatic web guide and standard slitting equipment are supplied with the unit. — Stanford Engineering Co.

Circle No. 12 on Readers' Service Card



High pressure valves

A new line of high pressure valves, the series RB split-body, barstock control valves, is now available. They are designed especially for handling high pressure liquids and gases. Built to 2500 lb. ASA rating, these valves are suitable for 6000 psig cold working pressure. RB valves are available in steel and 347 stainless steel in both straight-thru and angle construction, sizes ½ thru 1 in., with a variety of end connections. — Conoflow Corp.

Circle No. 13 on Readers' Service Card

Worm gear speed reducers

Fan-cooled helical worm gear speed reducers are available in ratios extending approximately from 34:1 to 394:1. The reducers come in seven sizes, ranging from 4- to 12-in. center distances. Ratings are fractional to 58.5 hp. — Cleveland Worm & Gear Division, Eaton Mfg. Co.

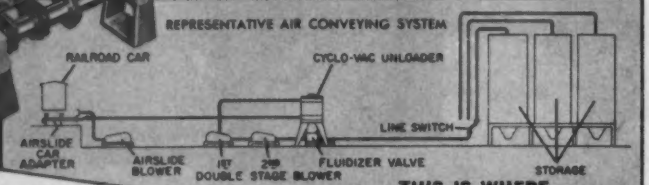
Circle No. 14 on Readers' Service Card

Copolymers

A new series of water-emulsion copolymers of vinylpyrrolidone will be marked under the name of Polectron. They offer dye receptivity, emulsion stability, adhesive properties and film-forming properties. The products have freeze-thaw stability, shear stability, and acid and salt tolerance. They can

Continued on page 202

THINKING ABOUT
BULK HANDLING?



Everyone knows Bulk Handling will cut costs—save money . . .

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The important point is:

FLUIDIZER
CAN DO IT *BETTER*... BECAUSE
FLUIDIZER HAS THE *EXPERIENCE*

Fluidizer pioneered in this area and knows what will work and how to pinpoint capabilities and limitations. You don't pay the penalty for costly guesswork. Experienced Fluidizer engineers create unique and imaginative approaches to specific customer requirements. Successful performance proved by repeat purchases. Call us for the *facts*.

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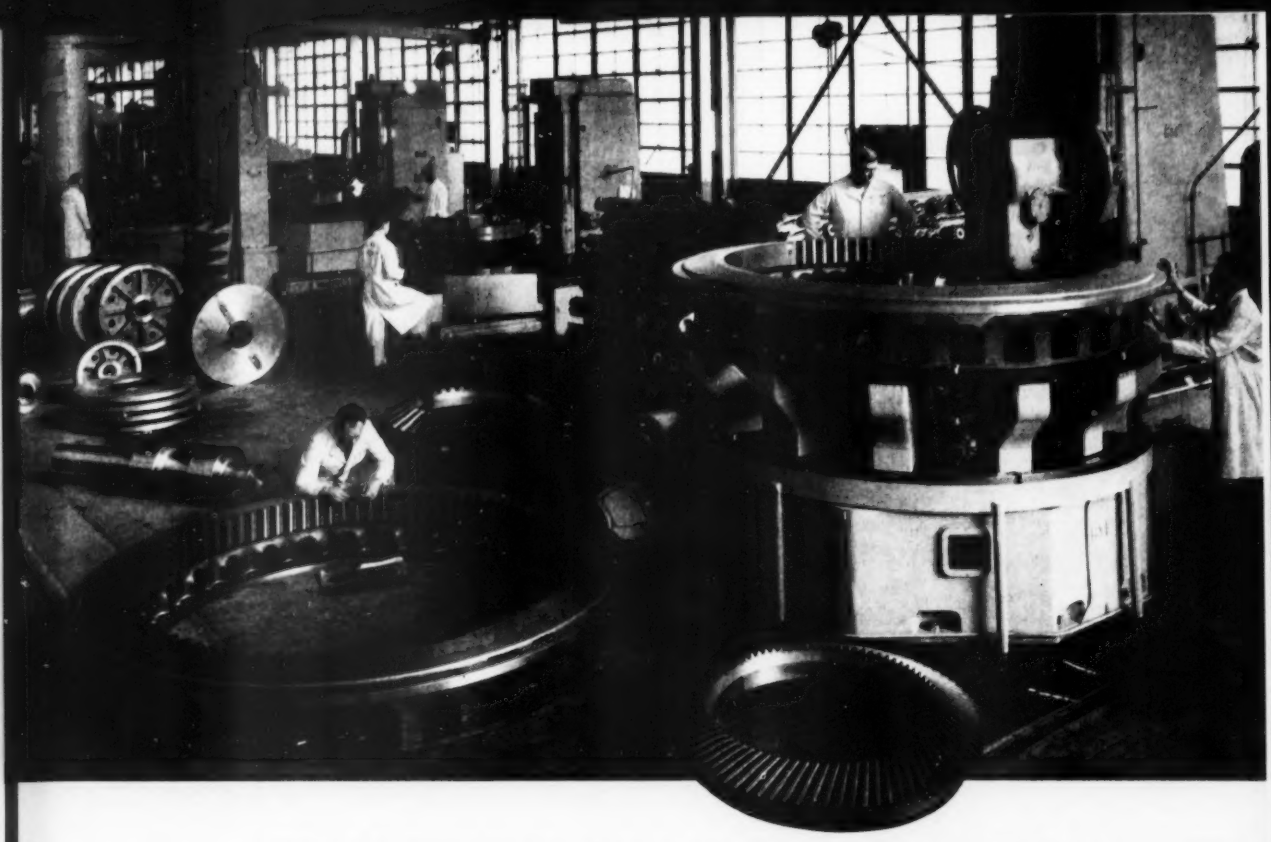

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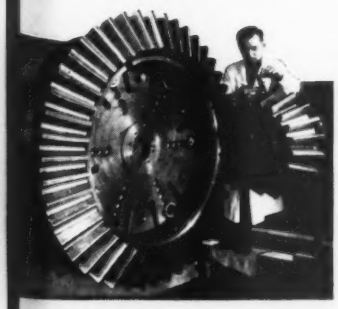
ILLINOIS GEARS

Testing Herringbone Gear With Integral Shaft Pinion



Power Equipment for Testing Large "Coniflex" Bevel Gears and Pinions

With every ILLINOIS GEAR comes the *extra dimension of perfection in quality*...quality that has remained unchallenged throughout the world.

Unchallenged because ILLINOIS GEAR goes far beyond the established standards in maintaining relentless, painstaking control of quality that extends through every step of manufacture to final delivery.

And...no matter how great the quantity, one gear or 10,000 or more...skilled craftsmen equipped with the world's finest and most modern tools and precision quality control equipment, make sure that these high standards of perfection are rigidly maintained in producing each and every gear.

For gears that are made right *with quality as the first consideration*—depend on ILLINOIS GEAR.

Look for this mark ILG® . . . the symbol on finer gears

ILLINOIS GEARS Reg. U.S. Pat. Off.

Gears for Every Purpose ... one gear or 10,000 or more

ILLINOIS GEAR & MACHINE COMPANY

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NEW PRODUCTS

Continued from page 200

be crosslinked by exposure to temperatures of 100°C. or higher for one-half to one hour. — General Aniline & Film Corp.

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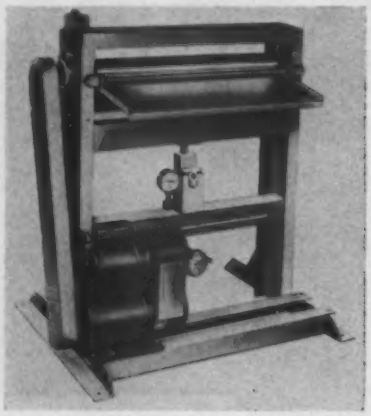


Perforating machine

A production perforating machine is now available for perforating paper, cardboard, and paper products. Small holes can be made with this machine on a production basis to make paper products porous, and easier to laminate. The machine is made in roll widths of 33, 48 and 60 in. with various needle pointed pin patterns. A standard machine is equipped with a variable speed drive. — Robert A. Main & Sons Inc.

Circle No. 16 on Readers' Service Card

Glove valve

The corrosion resistant globe valve differs from the conventional valve by featuring a non-rotating stem with a non-rising handwheel and fixed disc. In this manner, stem vibration and disc chatter are eliminated, as is galling between the stem foot and disc. — Alloy Steel Products Co.

Circle No. 17 on Readers' Service Card

Rubber latices

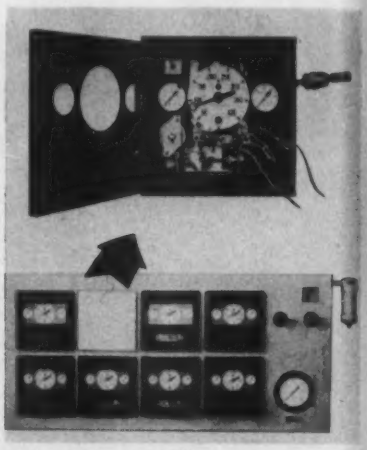
Two new butadiene-styrene synthetic rubber latices, designed for paper applications, are now available. The new materials, Pliolite 440 and Pliolite 460, are recommended for saturating and coating application with paper. Both latices are characterized by low viscosity and modified with carboxylics. — Chemical Division, Goodyear Tire & Rubber Co.

Circle No. 18 on Readers' Service Card

Tank valve

A valve designed especially to simplify and economize tank hook-up is now available. It eliminates reducing to match tank connections and the cross type body design replaces the pipe tee normally required for tank hook-up. The valve is available with 2, 3 or 4 in. grooved or threaded connections. — Instruments Inc.

Circle No. 19 on Readers' Service Card



Dryer control system

A new wet end dryer control system for use in the production of all types of paper and board is now available. Designed to improve finish and prevent picking, curling, and cocking, it is said to be fast acting, simple and accurate. The system automatically maintains any temperature desired in each dryer at the wet end, it shows the temperature set, the actual temperature inside the dryer, and flow and temperature of condensate leaving the dryer. — Stickle Steam Specialties Co.

Circle No. 20 on Readers' Service Card

Elapsed time indicator

The model 5700 elapsed time indicator can now be included as standard equipment or added to production machinery. Tamper-proof, this timing device is operated only when electrical equipment is energized. It records the exact time a machine has operated and proves indication of time for servicing and replacing parts. Its dial range is 99,999.9 hrs., or 99,999.9 minutes with 1/10 hr. or 1/10 minute minimum time indication respectively. — Automatic Timing & Controls Inc.

Circle No. 21 on Readers' Service Card

Level control instruments

A new line of level control instruments, including electric and pneumatic transmitters with alarm and on-off control functions, has been introduced. The instruments can be supplied in special materials for toxic, corrosive, and high-pressure (to 40,000 psi) services. The sensitivity of the new transmitters is 0.25 per cent. They can be supplied for temperatures up to 800° F. and are available with buoyant and displacer floats for liquid-or interface-level or specific-gravity applications. — Brooks Instrument Co. Inc.

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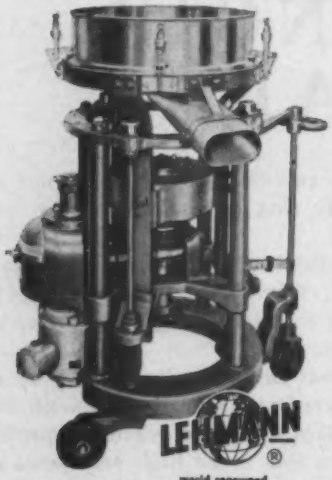

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has surprised the

PAPER INDUSTRY

This amazing screening machine never fails to impress paper mill executives who see it at work on: starch, clay and latex coatings; pigment slips; beater starch; tall oil; debarker water; and other materials. Some of the advantages are: use of finer mesh screens, fewer rejects, increased capacities, better product control and generally improved results. The gyratory action of the VORTI-SIV is adjustable both in speed and amplitude of gyration, to suit the material processed. It screens solids, liquids and slurries in meshes from 4 to 400. The screen is practically non-blinding.

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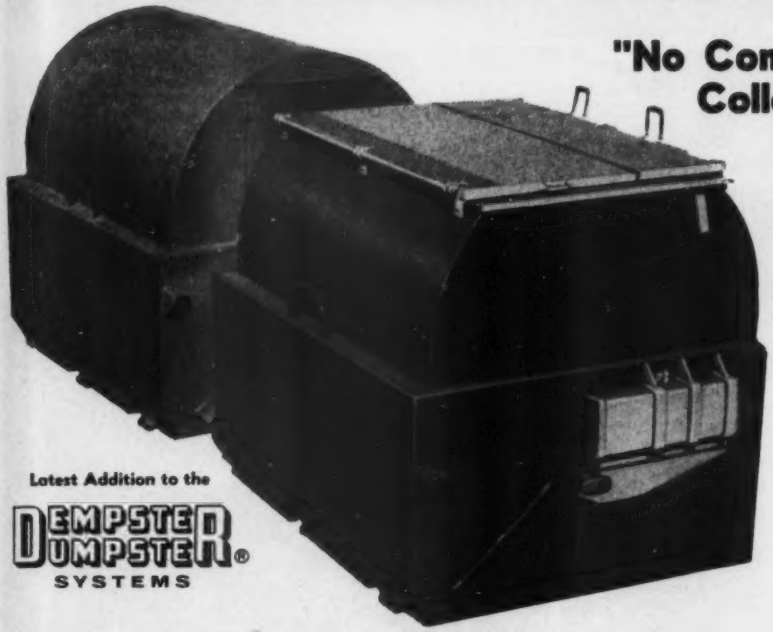
See our advertisement in Chemical Engineering Catalog

For more data circle 138 on Post Card

New SUPER DUMPMASTER Handles Converted DUMPSTER Containers...Beats Long-Haul Problem



Latest Addition to the DEMPSTER DUMPSTER® SYSTEMS

"No Container Haul System" Collects Refuse on Spot

If longer trips to disposal areas have raised your operating costs, a small investment in conversion kits protects large investments in DUMPSTER containers. The Super DUMPMASTER handles converted DUMPSTER containers up to 12 cu. yd. and all DUMPMASTER containers one thru 12 cu. yd.

Mfd. Only By DEMPSTER BROTHERS Inc.

Owners of DEMPSTER-DUMPSTER Systems who now face long haul problems due to movement of disposal areas may now convert from their present "container haul" system to the new SUPER DUMPMASTER "no-container-haul" system without abandoning their investment in DUMPSTER Containers.

The SUPER DUMPMASTER makes its rounds to each converted container, mechanically empties the contents into its 30 cu. yd. packer body and compacts the material to a fraction of its former volume with the 85,000 lb. force of its packer plate. Rather than haul each container to the disposal area, the SUPER DUMPMASTER carries the contents of many containers on each trip, cutting collection costs drastically.

Write Today for FREE BROCHURE

DEMPSTER BROTHERS Inc.

DEPT. PI-6 KNOXVILLE 17, TENN.

The SUPER DUMPMASTER engages container.

Clearance arms carry it toward hopper opening.

Container is rotated, emptying contents into the compaction body.

For more data circle 139 on Post Card

on more and more
paper machines —
it's
SURFACE-WIND
REELS by...

available with CENTER WIND ATTACHMENT

VALLEY IRON WORKS CORPORATION
APPLETON, WISCONSIN
a subsidiary of Allis-Chalmers Manufacturing Company

West Coast Representative: E. A. Berry, P. O. Box 958, Longview, Washington
Canadian Representative: Pulp and Paper Mill Accessories, Ltd., P.O. Box 850, Saint Laurent, Montreal 9, P.Q., Canada

VALLEY

For more data circle 140 on Post Card

NEW LITERATURE

Books

PULP AND PAPER — VOL. III PAPER TESTING AND CONVERTING. By James P. Casey, Director of Starch Sales, Union Starch and Refining Co. Published by Interscience Publishers Inc., New York. 2113 pp. Price: $29.50

This book is the third volume of the Second Edition. According to the author the greatest development over the past ten years, when the book first came out, has taken place in the areas of pulping, sheet formation and coating. This revised edition attempts to add to the information presented in the first edition.

This particular volume is concerned with the properties of paper, the use of statistics in the paper industry, pigment coating, printing, laminating and corrugating, saturation of paper and paper plastics, and resins.

CONTINUOUS ANALYSIS OF CHEMICAL PROCESS SYSTEMS. Written by Sidney Siggia, Manager, Analytical Service Research, Olin Mathiesen Chemical Corp. Published by John Wiley & Sons Inc., 440 Fourth Ave., New York 16. 381 pp.

The book presents details on all phases of the new analytical devices, designed to attain economical, accurate and continuous monitoring of chemical process systems.

All information in this book has been reviewed and approved by instrument companies manufacturing continuous analytical devices. Therefore, it is considered authoritative and up to date.

Each instrument is described according to principle of operation, range of application, accuracy and precision. The author also gives examples of the use of each instrument in specific applications.

USDA Reports

AVAILABLE from the Southeastern Forest Experiment Station, Ashville, N.C., is Station Paper No. 115, The Nantucket Pine Moth. This is essentially a study of the moth, its life, habits, and the damage it does to trees.

STATION PAPER No. 116 is available from the U. S. Dept. of Agriculture Forest Service, Southeastern Forest Experiment Station, Ashville, N.C. The booklet, Prescribed Burning For Understory Control In Loblolly Pine Stands of the Coastal Plain, presents the problem, and gives the results of solving it by fire.

Manufacturers' Publications

Copies of these publications are available at no obligation through our Readers' Service Department. Use the reply card which accompanies this issue when requesting items.

Paper mill cores

Sonoco Products Co. is offering a bulletin on their paper mill cores. It describes the two grades of cores, Durolene and Duro, plus giving information on metal ends and metal end core adapters. Core machinery manufactured by the company, is also described. Charts and tables supplement the photos of cores and machinery.

Circle No. 23 on Readers' Service Card

Flo-ball valve

Hydromatics Inc. has published a 6-page bulletin describing the features of the new flo-ball stock valve with Teflon seats and seals. The bulletin includes a cutaway drawing, and exploded view, parts table with materials of construction, and a dimension chart. A pressure-temperature rating curve and price list are also included.

Circle No. 24 on Readers' Service Card

Fourdrinier wires

Lindsay Wire Weaving Co. is offering a booklet entitled "Fourdrinier Wires for and in the Paper Industry". The first section describes the manufacture of the wires. Included here are illustrations of the wire mill division, weaving department, finishing department and machine shop.

Part II describes the use of the wires in paper mills. Included here is information on the fourdrinier machine, standard mesh specifications, and handling and installation of the wire. Supplementary to the booklet is a list of technical services and a glossary.

Circle No. 25 on Readers' Service Card

Kraft liquor evaporator control

Bailey Meter Co. is offering a 2-page, illustrated process application sheet describing the company's three-element effluent (heavy liquor) density control system. The bulletin describes how the performance of the evaporator phase of the Kraft Recovery System can be improved by the application of this system.

Circle No. 26 on Readers' Service Card

Hinged closures

Tube Turns Division of Chemetron Corp. has published a brochure on one-man hinged closures for wood chip digesters and extractors. Illustrations include typical vacuum, low- and high-pressure industrial uses and show one-weld installation and built-in safety factors. Charts give dimensional specifications.

Circle No. 27 on Readers' Service Card

Trolley conveyors

Link-Belt Co. has published a 58-page book entitled "Trolley Conveyors." Examples of many installations are shown, with combina-

"We use a Hardinge conical ball-mill driven by a large gear and pinion in the processing of tungsten and molybdenum concentrates. Silicious dust from the grinding was absorbed by the soaplike lubricant we were using and formed a highly abrasive compound. Frequent replacements of gears and pinions were major maintenance expenditures. The change to LUBRIPLATE Lubricants was the solution to our problem . . . not a gear nor pinion replacement in four years."

William F. Allen. Works Manager

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose . . . LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

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BRUSHES LARGE...

or Brushes Small...

JENKINS' supplies them all

Jenkins' METLKOR brushes range in length from less than 1 inch to more than 20 feet . . . and every one is built for peak performance, perfect balance, highest quality, longest life, lowest cost and quick delivery. If you have a problem where brush tools may be used to advantage, consult Jenkins'. Our Brush Engineers will be pleased to consult, run laboratory tests, and otherwise help to develop a brushing system. No cost or obligation.

Learn more about the wide range of Jenkins' Brush sizes and uses . . . send for new catalog designed to aid brush selection.

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METLKOR

the original . . . the best Metal Core Brush

and **LIFEWOOD®**

Wood Backed Brushes

M. W. JENKINS' SONS, INC.

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For more data circle 142 on Post Card

tions of photographs and layout drawings. Included is complete information for design of a trolley conveyor system, with components, supports, superstructures and guards. Complete tables of materials, dimensions, and specifications of components, easy-to-read drawings and cutaway photographs showing construction features are given.

Circle No. 28 on Readers' Service Card

Slitter roll

Jagenberg USA Inc. just published Bulletin No. 8204 describing the "Multi-Shear" slitter roll which can be installed in various winders. The two-page bulletin is illustrated with descriptive literature on the product.

Circle No. 29 on Readers' Service Card

Dial thermometers

Manning, Maxwell & Moore Inc. has issued a 20-page, two-color catalog illustrating and describing their line of bi-metal actuated dial thermometers. Every thermometer available is shown individually with construction features, sizes, stem lengths, dimensions, weights and general specifications.

Circle No. 30 on Readers' Service Card

Regulators and control valves

OPW-Jordan Corp. is issuing a bulletin on ductile iron regulators and control valves. The 4-page bulletin is also a condensed catalog of all the company's products. In addition, it illustrates and describes the sliding gate seats available in all regulators and control valves. The bulletin describes in detail the composition, properties and specifications of ductile iron valves and has a comparison table on steel, cast iron, and red brass versus ductile iron, plus, the results of a test on ductile iron.

Circle No. 31 on Readers' Service Card

Recording type controllers

Stickle Steam Specialties Co. has published a bulletin describing recording type controllers. Diagrams and illustrations are given, as are details on diaphragm motor valves.

Circle No. 32 on Readers' Service Card

Felt cleaner

E. F. Houghton & Co. has issued a data sheet on Cerfak 547, a one piece felt cleaner. The sheet gives information on use, and shipping, and also gives a description of the products.

Circle No. 33 on Readers' Service Card

Paper equipment

J. O. Ross Engineering and Waldron-Hartig Division of Midland-Ross Corp. now have available a 6-page bulletin describing their coordinated equipment for the paper industry. It includes pictures and information on air processing equipment, web processing machinery and coordinated equipment and research facilities.

Circle No. 34 on Readers' Service Card

Waterproofing insulated surfaces

Chemical Fire & Rust Proofing Corp. is offering a bulletin describing the uses and applications of waterproofing insulated surfaces.

Circle No. 35 on Readers' Service Card

pH Meters

Scientific & Process Instruments Division of Beckman Instruments Inc. is offering a descriptive bulletin on their Model G and GS pH meters. The bulletin features description, specifications, applications, and ordering information.

Circle No. 36 on Readers' Service Card

Here's How You Can Train Your Supervisors in...

COMMUNICATION FOR SAFETY

A realistic to-the-point series of 4 films teaches foremen how . . . by showing them how.

Again . . . from the National Safety Council . . . comes another supervisor training series: the all-new COMMUNICATION FOR SAFETY. Here are four films, produced by the same National Safety Council team that has won applause from safety-minded companies across the nation, with: "Safety and the Foreman"; "Supervising For Safety"; "Safety Management For Foremen"; "Speaking of Safety"; and "Human Factors in Safety". Remember — your company's safety program must be carried to your employees mainly by your supervisory personnel. It's up to them to learn the art of communication — not only for safety but to help make their work as supervisors more effective. THE COMMUNICATION FOR SAFETY film series is one way — an economical way—to TEACH THEM HOW BY SHOWING THEM HOW.

Send for further information today!

NATIONAL SAFETY COUNCIL
425 N. Michigan Ave.
Chicago 11, Illinois

Send for free brochure on NSC film series "Communication for Safety"

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For more data circle 143 on Post Card

CLASSIFIED ADVERTISING

ANY SPARE TIME?

Make your paper mill knowledge add to your income. No selling. Confidential. Write Box 710, The Paper Industry.

ENGINEERS — TECHNICAL SALES

We are seeking several engineers with pulp and paper industry experience interested in Technical Industrial Sales. Position requires sales contacts and engineering for handling systems and heavy equipment in the U. S. and abroad. Knowledge of dry end operations will be helpful. An engineering degree, or its equivalent in experience, plus an interest and ability to work with customers at upper levels of management are basic requisites. Must be willing to relocate to West Coast. Salary commensurate with experience. Resume should include complete personal and professional qualifications, present salary and photograph. Reply to Box 712, The Paper Industry.

Have you read it?
PAPER AND PAPERBOARD MAKING
by Harry Williamson

This widely-read book, filled with practical know-how, covers all phases of stock preparation and sheet formation including the fundamental principles of making paper on the fourdrinier machine and paperboard on the multiple cylinder machine. 372 pages.

Price $6.00 prepaid with order
FRITZ PUBLICATIONS, INC.
431 South Dearborn Street, Chicago 5, Illinois

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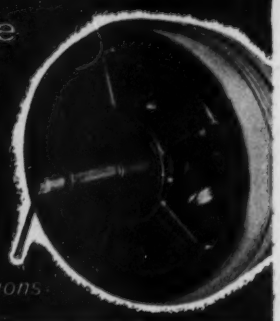
For complete accurate control

for constant slip, tension control— main drives for inching and slow acceleration applications



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Simple, sound and foolproof, Horton Clutches can be installed and maintained by your personnel. Fractional to 200 h.p. sizes with *complete drive package* if you specify.

Over 3 decades of dependable service

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1179 - 15th Avenue S.E., Minneapolis 14, Minnesota

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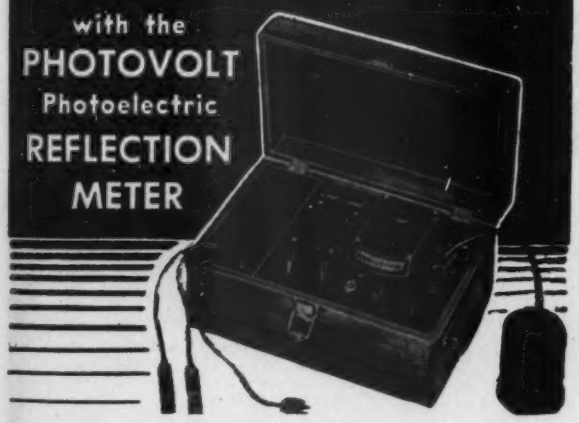
You Can Be Sure!

with the PHOTOVOLT Photoelectric REFLECTION METER



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Brightness and Opacity
of pulp and paper in terms of TAPPI specifications.
Also for ***Gloss and Color***
tests on paper, card board, and other paper products.
Portable, reliable, rugged, simple to operate
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PHOTOVOLT CORP.
1115 BROADWAY NEW YORK 10, N. Y.

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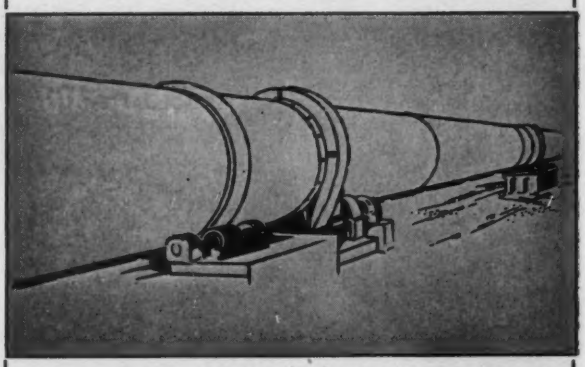

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All equipment made by Vulcan must measure up to the standard of quality and responsibility it has taken 111 years to earn. Contact Vulcan today . . . estimates, constructive suggestions and preliminary drawings will be furnished (as far as possible) without obligation.

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VERTICAL LIME KILNS—CALCINERS—ELECTRIC HOISTS—24' GEARS

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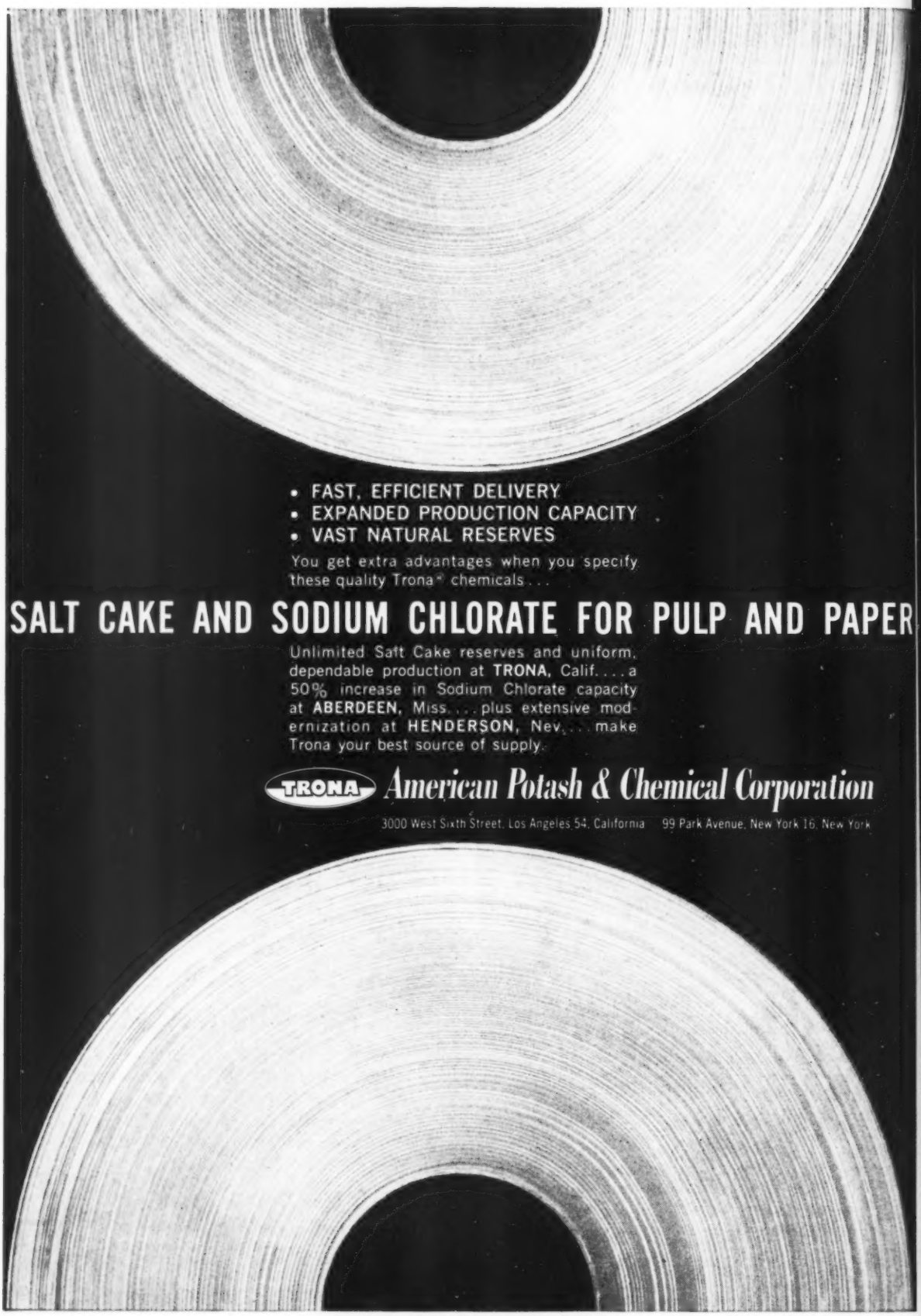
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You get extra advantages when you specify these quality Trona® chemicals . . .
SALT CAKE AND SODIUM CHLORATE FOR PULP AND PAPER
Unlimited Salt Cake reserves and uniform, dependable production at TRONA, Calif. . . . a 50% increase in Sodium Chlorate capacity at ABERDEEN, Miss. . . . plus extensive modernization at HENDERSON, Nev. . . . make Trona your best source of supply.
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American Potash & Chemical Corporation
3000 West Sixth Street, Los Angeles 54, California
99 Park Avenue, New York 16, New York

For more data circle 147 on Post Card

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.
No. 1 white shirt cuttings	10.00— 10.50
Soft unbleached muslins	13.50— 14.00
Fancy shirt cuttings	2.00— 3.00
No. 1 percales	4.00— 5.00
No. 1 washables	2.00— 2.25
No. 1 light silesias	6.50— 7.00
No. 1 light prints	3.00— 4.00
Light flannelettes	5.50— 6.00
Cottonades	2.25— 2.50
Blue overall cuttings	5.00— 5.50
Blue cheviots	6.75— 7.25
Canton flannels, bleached	9.00— 10.00
Canton flannels, unbleached	10.50— 11.00
Osnaburg cuttings	8.50— 9.00
Underwear cuts, bleached	10.50— 11.00
Underwear cuts, unbleached	10.50— 11.00
Sun tan khaki cuttings	5.00— 5.50
America linen cuttings	6.75— 7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York.

	per cwt.
No. 1 roofing (Chicago)	.65— .70
No. 2 roofing (Chicago)	.55— .60
Twos and blues, repacked	2.00— 2.25
Thirds and blues, repacked	1.50— 1.75

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	85.00— 90.00
No. 1 hard white shavings	70.00— 75.00
No. 1 soft white shavings	45.00— 50.00
Soft white shavings, uncoated	55.00— 60.00
Fly leaf shavings No. 1	17.00— 22.00
Fly leaf, woody, No. 1	17.00— 20.00
Mixed colored shavings	16.00— 18.00
No. 1 books and magazines	13.00— 15.00
Ledger stock, white, No. 1	40.00— 45.00
Ledger stock colored, No. 1 (Midwest ship)	27.50— 30.00
New manila envelope cuttings (free of groundwood)	50.00— 55.00
New manila envelope cuttings (containing groundwood)	40.00— 45.00
Manila tab cards	50.00— 55.00
Colored tab cards	40.00— 42.50
New northern kraft envelope cuttings	50.00— 55.00
Triple sorted kraft, 100%	30.00— 32.50
No. 1 old kraft	22.50—
White news cuts, No. 1	40.00— 45.00
No. 1 overissue news	15.00— 17.00
Folded news, special	11.00— 12.00
Folded news, ordinary	9.00— 10.00
Old corrugated boxes	16.00— 17.00
New jute corrugated cuts	19.00— 20.00
Mill wrappers	9.00— 11.00
Boxboard cuttings	4.00— 5.00
No. 1 mixed paper	1.00— 4.00

CHEMICALS

F.o.b. New York City

Alum, ammonium	
Granular, bags, works, cwt.	4.30—
Lump, drums, works, cwt.	5.05—
Powdered, drums, works, cwt.	5.20—
l-Arginine, drums, kilo	90.00—
Blanc Fixe	
Direct process, bags, c.l., works, ton	160.00—
L. c. l., ton	170.00—
Casein, domestic acid precipitated	
30-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.56—
80-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.64—
Imported, 30M	
Argentine, ex-dock, c. l., lb	.18½—
30M N.Z. Lactic, ex-dock, c. l., lb.	.25—
China Clay, domestic dry-ground, airfloat, 99%	
325-mesh bags, c.l., Georgia works, ton	11.00— 17.00
300-mesh bags, c.l., Georgia works, ton	13.50— 22.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me. gross ton	23.00— .35.00
Chlorine, liquid	
Tanks, single units, works, freight equaled, cwt.	3.25—
Glycerine, refined (CP, USP) 99%, drums c. l., delivered lb	.26⅛—
Litharge, commercial powdered	
Barrels, c. l., works, freight equaled lb.	.13¼—
Rosin, gum, c. l., f.o.b. New York, cwt.	
K, M	13.00—
N	13.25—
WG	13.50—
WW	13.75—
Rosin, wood, c. l., f.o.b., shipping point, cwt.	
K, M	11.00— 12.00
N	11.25— 12.35
WG	11.50— 12.55
WW	11.75— 12.88
Saltcake, domestic, bulk works, 100% Na_2SO_4 basis ton	28.00—
Soda Ash	
Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper bags, c.l. works, cwt	1.85—
Soda, caustic	
Flake, 76%, drums, c. l. works, freight equalled, cwt	5.20—
Solid, 76%, drums, c. l. works, cwt.	4.80—
Sodium Silicate	
40°Be, 1:3.2, turbid, drums, c. l., works, cwt.	1.65—
52°Be, turbid, 1:2.4, drums, c. l., works, cwt.	2.65—
Starch	
Pearl, 140-lb. bags, cwt.	6.73—
Pearl, 100-lb. bags, cwt.	6.58—
Powdered, 100-lb. paper bags, cwt.	6.78—
Sulfur, crude	
Bulk, c. l. mine, contract, long ton	23.50—
Talc	
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Pigment	
Calcium-rutile base, regular, bags, c. l., lb.	.09¾—
High-tinting, drums, c. l., lb.	.14¾—
Zinc Oxide Pigment, American process	
Lead-free, bags, c. l. freight allowed, lb.	.12½—
Leaded, 35%, bags, c. l., freight allowed, lb.	.14 —

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	140.00—
Bleached sulfite, Canadian	140.00—
Unbleached sulfite, Canadian	125.00—
Bleached soda	130.00—135.00
Bleached soda, Canadian	130.00—135.00
Kraft, bleached hardwood	135.00—140.00
Kraft, bleached	145.00—150.00
Kraft, bleached southern	135.00—140.00
Kraft, bleached Canadian	150.00—
Kraft, unbleached southern	120.00—
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	135.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft semi-bleached southern	130.00—

Quotations on imported wood pulp dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite Swedish freight allowed	140.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	140.00—
Bleached sulfite Finnish freight allowed	140.00—
Unbleached sulfite, Swedish, freight allowed	125.00—130.00
Unbleached sulfite, Finnish, freight allowed	125.00—130.00
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft bleached Swedish freight allowed	152.00—160.00
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Book Paper (f.o.b. Chicago, c.l skids per cwt):	
No. 1 enamels	20.80
No. 2 enamels	19.80
Machine-coated, 45- to 100-lb.	15.55— 19.00

Newsprint (contract base price) per ton	
Rolls, standard	135.00
Sheets	Standard differentials

Kalamazoo

WOOD TANKS

Built from best tank grade lumber. Backed by over 90 years' tank building experience. *Kalamazoo* can give you what you want. Free estimates and suggestions. Write today.

WOOD TANK DIVISION

Kalamazoo TANK and SILO COMPANY

661 HARRISON ST., KALAMAZOO, MICHIGAN

For more data circle 148 on Post Card

Ten Publications for Papermakers

Pulp and Paper (Casey)	
Vol. I, Pulping and Bleaching	$19.50
Vol. II, Papermaking	25.00
Vol. III, Paper Testing and Converting	29.50
Paper and Paperboard Making (Williamson)	6.00
Adhesives in the Paper Industry	2.00
Lessons in Papermaking—Part 1 (Williamson)	1.50
Lessons in Papermaking—Part 2 (Williamson)	1.50
Notes and Observations on Beaters	1.00
Trouble on the Paper Machine	.75
Lubricants and Lubrication Equipment in the Pulp and Paper Industry	.50

Mail your order with payment to:

The PAPER INDUSTRY

431 S. Dearborn Street, Chicago 5, Illinois

NEW INSTANT MOISTURE CHECK ON MOVING ROLLS

On moving paper rolls, on production lines, with roller type, plug-in electrode.

Other plug-in electrodes for flats, skids, rolls. Deep or shallow penetration.

Instant, accurate registration of moisture content and patterns on moving paper rolls is now possible. The PM Model is accurate in the 0%-40% range on paper, paper board and similar materials of known density. A nomagraph eliminates calibration curves. Three different plug-in electrodes, automatic compensation for 90-130 volt line fluctuation, and zener diode protection add to usefulness.

Moisture Register's new portable PM Model has many features:

- Checks moving rolls.
- Multiple range settings.
- Nomagraph eliminates calibration charts.
- Master Unit takes plug-in electrodes for many uses.
- Tests stacks, skids, hardboard.
- 6", 3", and ⅛" penetration with R-1, D-1, S-1 electrodes respectively.
- Easy to use, with easy-to-read 0-100 division scale.

Manufacturers of the Model 5 line of RF instruments.

SEND FOR NEW TECHNICAL DATA and information on 2-week free trial.

ELECTRONIC MOISTURE REGISTER Instruments

Moisture Register Company, Dept. PI
P. O. Box 910, Alhambra, California

Firm _____

By _____ Title _____

Address _____

City _____ State _____

For more data circle 149 on Post Card

PATENT REVIEWS

Continued from page 196

signed to Toulmin & Toulmin, describes a process for improving the wet strength of products obtained from cellulosic pulp.

N-hydroxymethylated 1,6-diureido-hexane is applied in a liquid carrier to the surface of the paper, and is allowed to be imbibed in it. After the excess is removed, the paper is heated to 80-130°C. for 40-180 seconds.

The resulting paper has improved wet strength, without materially changing its appearance, pliability, porosity, feel, or power of absorbing water or inks.

Manufacture of paperboard

U.S. 2,967,116, issued Jan. 3, 1961 to William K. Hollinger, Robert H. Hollinger, and Alvis R. Patterson, and assigned to Control Pak Corp., describes a method of increasing the strength of a corrugated paper blank.

The blank is immersed in a composition containing 70-95 parts by weight of mineral wax and 5-30 parts by weight of a petroleum polymer resin having an A.S.T.M. ring and ball softening point above 158°F. for a period sufficient to incorporate at least 26 per cent of the composition in the blank at 180-250°F.

After removing the blank, it is subjected to a temperature of 250-350°F. to facilitate removal of excessive amounts of the wax-resin composition.

High dry strength paper

U.S. 2,963,396, issued Dec. 6, 1960 to John J. Padbury, Walter M. Thomas and Walter H. Schuller and assigned to American Cyanamid Co., describes a process for the manufacture of paper of substantially improved dry strength but of substantially unimproved wet strength.

The process consists of forming an aqueous suspension of the papermaking cellulosic fibers, adding to it an aqueous solution of a cationic linear acrylamide-vinylpyridine copolymer, sheeting the fibers to form a cellulosic web, and heating the web until dry, to develop the strengthening properties of this copolymer on the web.

Other Patents of Interest

Subject	Inventor or Assignee	Patent No.	Date
Debarking apparatus	Jackson Industries Inc.	2,958,350	11/1/60
Thermoplastic coating for paper	Low Paper Co.	2,958,364	"
Paper machine forming section	Beloit Iron Works	2,958,379	"
Paper trimming and piling apparatus	Rice Barton Corp.	2,958,431	"
Apparatus for stacking sheets of wood pulp in bales	Eyvind B. Borthen et al	2,958,433	"
Container divider	American Can Co.	2,958,452	"
Boxes	Metal Edge Industries (Inc.)	2,958,453	"
Pulping process	Arthur D. Little Inc.	2,958,622	"
Pickup and press section	Beloit Iron Works	2,959,222	11/8/60
Carton	Container Corp. of America	2,959,323	"
Cartons	Metal Box Co. Ltd.	2,959,336	"
Box closure	William Bradford Crane Jr.	2,959,337	"
Package	Gerald E. Thurston	2,959,338	"
Food carton	Raymond H. Sierk et al	2,959,339	"
Pad for packing articles	Waldorf Paper Products Co.	2,959,340	"
Bag	Bemis Bro. Bag Co.	2,959,343	"
Laminated paperboard products	Hercules Powder Co.	2,959,512	"
Apparatus for compressing stacks of tissue paper	Kimberly-Clark Corp.	2,960,023	11/15/60
Combined pulpwood saw and loader	Jackson H. O'Quinn	2,960,123	"
Production of longitudinally curved webs of paper or cardboard	Gottfried Ruegenberg	2,960,145	"
Wood chip board	Otto Kreibaum	2,960,423	"

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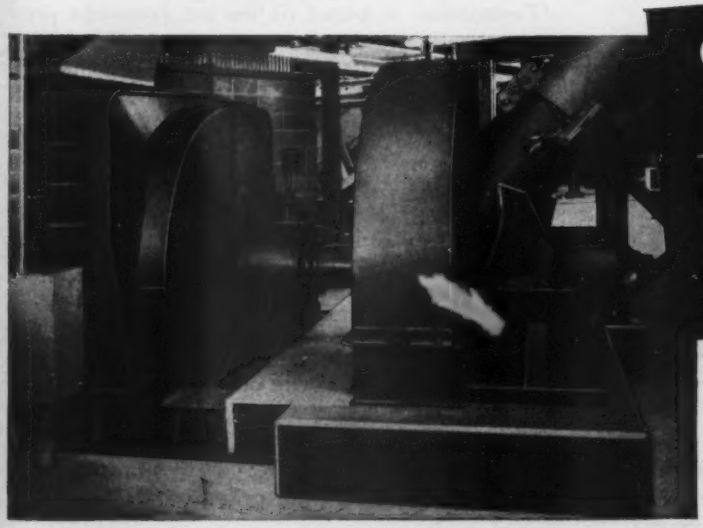

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Stabilize Logs in Spout for Uniform, Clean-Cut Chips

With at least two knives cutting at all times, the log is held steady in the spout. Consequently the chips are clean-cut and uniform in length. Log stability, resulting from close spacing of knives, is achieved by three important Carthage design features:

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Carthage Standard Chipper similar to that at
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whither?

in production
processes
new products
markets

Sea-water conversion plants slated for mass production

Line production of sea-water conversion plants will be started by Fairbanks-Morse at its Beloit plant this year. The firm believes that the vacuum freezing process developed by Alexander Zarchin of Israel is the most economical approach to the problem of getting fresh water from the sea. The mass production units will be designed with the view to permitting subsequent incorporation of all modifications or improvements as these are being developed.

Determination of pentosan content

A comparative evaluation by the National Bureau of Standard of the orcinol colorimetric method used in Sweden and the aniline acetate colorimetric method widely used in this country for the determination of pentosans in cellulose showed the superiority of the orcinol colorimetric method. It was found that five measurements with the aniline acetate method were necessary to achieve the same precision obtained from a single measurement by the orcinol method.

Central job intelligence agency proposed

To meet the crisis presented by automation in industry, Melvin H. Baker of National Gypsum proposes the creation of a central job intelligence agency which, on a national scope, would inform workers about new job opportunities and the skills needed to fill them.

Automation and other technological advances, he said, are vital to industry and the "crisis" presented by automation is not so much one of employment as it is one of education and retraining.

120 million pounds of plastic resins for paper manufacturing and converting

The sale of water-based plastic resins for paper manufacturing and converting was estimated by C. A. Godsell of Shawinigan Resin Corp. at $50 million for 1961. In materials output this amounts to some 120 million pounds of resin. One of the more important and fast growing applications for plastic materials is that of wet-end addition, according to Mr. Godsell.

New process to recover ammonia from pulping effluent

The process, developed by Ontario Research Foundation, is based on the ion exchange principle and involves the removal of all calcium, magnesium and iron ions before ammonia can be removed by the resin bed.

In the absence of chemicals recovery methods, the cost of chemicals used in various pulping methods has been estimated as follows: calcium chemicals — $1 to $4 per ton; sodium chemicals —$13 per ton, and ammonia chemicals $6 per ton of pulp produced. With 65 per cent of the ammonia being recoverable in the new process, it could well be that ammonium sulfite pulping may replace calcium bisulfite pulping as a more advantageous method both on grounds of economy and stream pollution.

Koppers wood treating process

The new process pressure-treats lumber and plywood with pentachlorophenol by using a liquefied gas in a pressure vessel to force the preservative into the wood fiber.

The process does not affect such wood properties as color, weight, strength, workability, gluability, etc. according to Koppers. The treated wood can be clean finished, painted and resists termites and decay.

A good line to remember

Mark this down with your lines of truth: "Coated stock with a uniform finish makes sales go up." CLINTON starches and dextrins make sure your coating is consistently smooth and free from "skips." When gloss printing quality and strength count most, use CLINEO starches. And, to improve all-around printability and control curl, specify CLINCAL starches (they contain their own lubricants). With these starches, you can select from many varieties. Customers and prospects who judge paper on its face value can see and feel the difference when you use CLINTON coating starches.

Technical service always available

CLINTON CORN PROCESSING COMPANY

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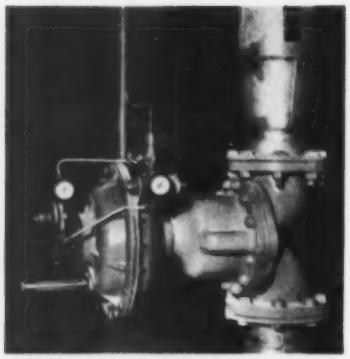
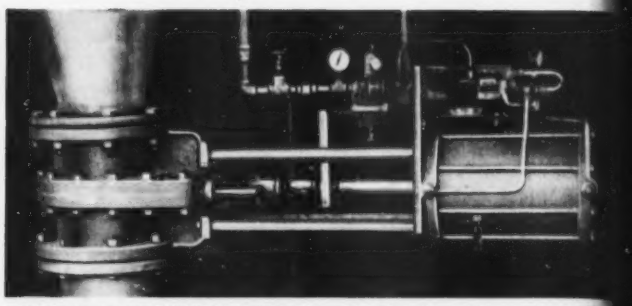
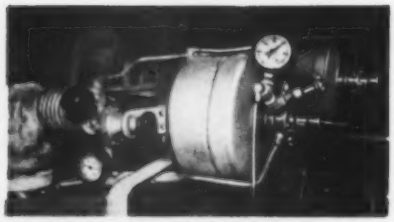


SAUNDERS VALVE (Conoflow close-coupled type) affords automatic throttling control of white water in bleach plant at Marathon Southern's Naheola, Alabama mill. Conoflow is the world's largest producer of Saunders valves for automatic control.



PULP STOCK VALVE (8" Walworth with Conoflow actuator) automatic control service at Crossett Paper Mills, Crossett, Arkansas. Conoflow actuated pulp stock valves are available in all sizes.



CONTROL VALVES (Conoflow Series LB) on a tough service at the R-W Paper Company plant in Longview, Washington. These 2" single-seated angle valves are handling steam at 700°F. and 600 psi with a 580 lb. pressure drop.

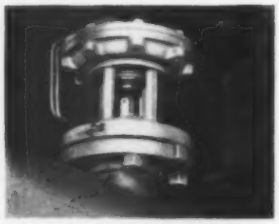
CONOFLOW

CONTROLLED FLOW

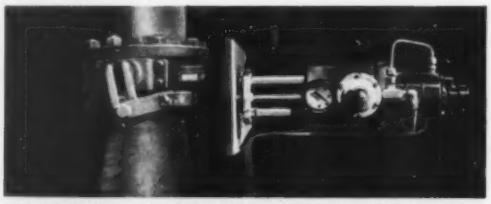
AUTOMATION IN PAPER MAKING

The installations shown here are typical of how Conoflow final control elements have helped bring automation to the pulp and paper industry. Conoflow products make possible faster, more efficient operations, and substantial savings of costly process fluids for many modern paper mills.

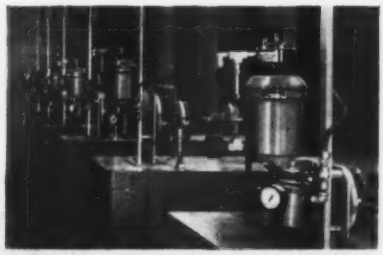
VALUABLE DATA FREE! To find out where automatic process control can help you, write for Bulletin MD-1 *Application of Conoflow Equipment in Modern Pulp and Paper Making Processes.* Also ask for reprint *How to Use Standard Pulp Valves for Throttling Control*—a thought-provoking and informative article. Both will be mailed to you promptly, without obligation. Dept. C-901, Conoflow Corporation, 2100 Arch Street, Philadelphia 3, Pa. Conoflow engineering representatives are located in principal cities throughout the world.



PRESSURE TRANSMITTERS (Conoflow Model P) measuring pressure of pulp stock during bleaching process at the P. H. Glatfelter paper plant in Spring Grove, Pa. This is one of several Conoflow Model P's measuring pressure and liquid level at this mill.



BUTTERFLY VALVE (Conoflow actuated) on automatic control service at Crossett Paper Mills, Crossett, Arkansas.



CURRENT CONTROLLERS (Conoflow Model EB) regulating speed of washer thickeners in bleach plant at Marathon Southern mill in Naheola, Alabama. The Model EB is a unique pneumatic-electric transducer—a Conoflow exclusive for the paper industry.

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FOREMOST IN FINAL CONTROL ELEMENTS

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